156386

United States Air Force
Installation Restoration Program
Castle Airport, California

Source Control Operable Unit
Record of Decision
Part 2

Final

May 2003

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156386

INSTALLATION RESTORATION PROGRAM

SOURCE CONTROL OPERABLE UNIT
RECORD OF DECISION
PART 2

CASTLE AIRPORT
CALIFORNIA

MAY 2003

FINAL

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LIST OF ACRONYMS AND ABBREVIATIONS

μg/dL	micrograms per deciliter
μg/L	micrograms per liter
ADD	average daily dose
AFBCA	Air Force Base Conversion Agency
AOC	area of concern
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirements
AST	aboveground storage tank
BACT	best available control technology
BAT	best available technology
BCT	BRAC Closure Team
BCPCT	best conventional pollutant control technology
bgs	below ground surface
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAFB	Castle Air Force Base
CB	comprehensive basewide
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	confined
CFR	Code of Federal Regulations
CRP	Community Relations Plan
COC	contaminant of concern
COPC	chemical of potential concern
CSA	contaminant source assessment
DA	discharge area
DCA	dichloroethane
DCE	dichloroethene
DLM	designated level methodology
DOD	Department of Defense
DTSC	California Department of Toxic Substances Control
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERA	ecological risk assessment
ETC	Earth Technology Corporation
FAA	Federal Aviation Administration
FFA	Federal Facility Agreement
FR	final rule
Freon 11	trichlorofluoromethane
Freon 113	1,1,2-trichloro-1,2,2-trifluoroethane
FS	feasibility study
FTA	fire training area
GAC	granular activated carbon
HEAST	health effects assessment summary tables

HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HSZ	hydrostratigraphic zone
HWS	hazardous waste storage
ICs	institutional controls
IRIS	integrated risk information system
IRP	Installation Restoration Program
IT	IT Corporation
JEG	Jacobs Engineering Group
JP-4	jet fuel #4
JPA	Joint Powers Authority
LADD	lifetime average daily dose
LDR	land disposal restriction
LF	landfill
LOAEL	lowest-observed-adverse-effect level
LOX	liquid oxygen
LRA	local reuse authority
LSS	lower subshallow
LTU	land treatment unit
LUC	land use covenant
MBS	main base sector
MCL	maximum contaminant level
MDL	method detection limit
MEK	methyl ethyl ketone
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	no further action
NFEI	no further ecological investigation
NOAEL	no-observed-adverse-effect-level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	operation and maintenance
OU	operable unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PFFA	POL fuel farm area
PID	photo ionization detector
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
POL	petroleum, oil, and lubricant
RA	remedial action
RAB	Restoration Advisory Board

RAOs	remedial action objectives
RCRA	Resource Conservation and Recovery Act
RFA	RCRA facility assessment
RfD	reference dose
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SA	site assessment; storage area
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SCOU	Source Control Operable Unit
SF	slope factor
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control Board
SOV	soil organic vapor
SS	sewer segment
SSG	sanitary sewer group
START	SVE Turn-on and Remediation Test
STOP	SVE Termination or Optimization Process
SVE	soil vapor extraction
SVOC	semivolatile organic compounds
SWMU	solid waste management unit
SWRCB	State Water Resources Control Board
TBV	threshold background value
TCE	trichloroethene
T&E	technical and economic evaluation
TEPH	total extractable petroleum hydrocarbon
TPH	total petroleum hydrocarbon
TSCA	Toxic Substances Control Act
TVPH	total volatile petroleum hydrocarbon
UCL	upper confidence limit
UF	uncertainty factor
UFL	underground fuel leak
USAF	United States Air Force
USC	United States Code
U.S. EPA	United States Environmental Protection Agency
USS	upper subshallow
UST	underground storage tank
UTS	universal treatment standards
VOC	volatile organic compound
WET	waste extraction test
WQSA	water quality site assessment

1.0 DECLARATION

Site Name and Location

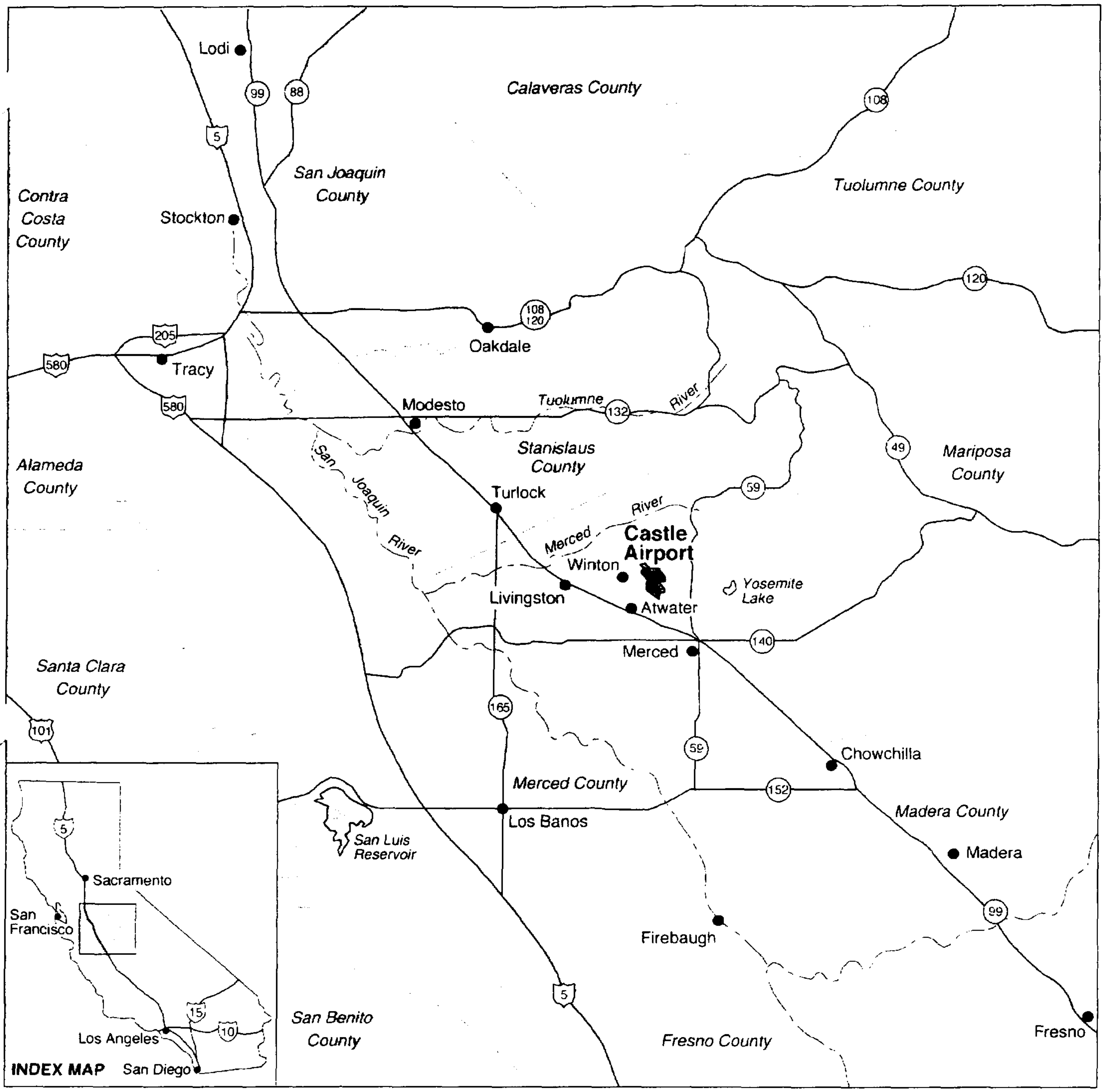
Castle Airport (formerly Castle Air Force Base[CAFB]), Merced County, California (Figure 1-1)
U.S. Environmental Protection Agency (U.S. EPA) identification: CA3570024551

Statement of Basis and Purpose

This record of decision (ROD) presents the selected remedies for 41 of the 233 Source Control Operable Unit (SCOU) sites at Castle Airport in Merced County, California (Figure 1-1 and Plate 1, Appendix A). In addition, this ROD documents 12 SCOU sites as exempt from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The selected remedies for the 41 sites were chosen in accordance with CERCLA, as amended by Superfund Amendments Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The remedial decisions in the SCOU ROD Part 2 are based on the findings of the Castle Airport *SCOU Remedial Investigation/Feasibility Study* (RI/FS) (Jacobs Engineering Group [JEG], 1997a), the *SCOU Data Gap Investigation Report* (JEG, 1999) and other associated SCOU documentation included in the Castle Airport Administrative Record. The Administrative Record index is provided in Appendix B. The 12 non-CERCLA sites, which are stains from aircraft engine exhaust emissions that are excluded from the CERCLA definition of a release (42 U.S. Code [USC] 9601.22), are included in Section 4.0 of this ROD strictly for administrative tracking purposes. The stain sites will be addressed, as appropriate, under applicable Resource Conservation and Recovery Act (RCRA) and State of California laws and regulations, including those for protection of groundwater quality. The U.S. EPA and the State of California concur with the selected remedies included in the SCOU ROD Part 2. This ROD has been prepared in accordance with U.S. EPA guidance (U.S. EPA, 1999).

Assessment of the Sites

The response actions selected in this ROD are necessary to protect human health and groundwater quality from actual or threatened releases of hazardous substances and pollutants or contaminants as defined in NCP Part 300.5.



EXPLANATION

Interstate Highway

U. S. Highway

State Highway

County Line

0 3.75 7.5 15 Miles

Location of Castle Airport

Figure 1-1

37917.20.13.01 Fig 1-1 Site Location Map

The 53 sites addressed in this ROD are divided into four categories described below:

- 21 sites with volatile organic compounds (VOCs) and fuel hydrocarbons (VOC Sites)
- 6 waste oil tank and oil/water separator (OWS) sites with fuel hydrocarbons, semi-volatile organic compounds (SVOCs), and metals (Waste Oil Tank and OWS Sites)
- 14 no further action (NFA) sites where levels of contaminants do not present adverse risk to human health or groundwater quality (No Further Action Sites)
- 12 CERCLA-exempt sites with aircraft engine exhaust stains on the taxiway (CERCLA-Exempt Sites).

Description of Selected Remedies

The SCOU ROD Part 2 selected remedies are designed to remove contaminants in the soil that pose an adverse risk to human health or groundwater quality. The soil was contaminated as a result of historical operations at CAFB, primarily activities associated with aircraft maintenance.

- VOC Sites: Soil Vapor Extraction (SVE) (supplemented with excavation and bioventing at Discharge Area 5, and excavation at Discharge Area 4)

  SVE employs the use of vapor wells to extract VOCs from the subsurface. This method is an efficient and cost effective means of removing VOCs from sandy soils, such as those at Castle Airport. The extracted vapors are combined using conveyance piping and treated to remove contaminants. Soil vapor extraction will be employed until VOCs no longer pose an adverse risk to human health or groundwater quality. Treatment equipment and aboveground piping will be removed, and wells will be properly abandoned upon termination of SVE. The surface of the site will be restored to its prior condition. Excavation and bioventing will be performed at the Discharge Area 5 sites upon completion of SVE to remove nonvolatile fuel hydrocarbons. Additionally, excavation will be performed at Discharge Area 4 in the vicinity of the French drain upon completion of SVE. The remedial action objectives (RAOs) for SVE and soil excavation are established in Section 2.8.1.

- Waste Oil Tank and OWS Sites: Excavation and Off-Site Disposal

  Soil contamination will be excavated and disposed of at an approved off-site facility. Soil samples will be collected from the bottom and sidewalls of the excavation to confirm removal of contaminants posing an adverse risk to human health or groundwater quality. The excavation will be backfilled and compacted with clean materials, and the site will be restored to its prior condition. Excavation is an economical, permanent, and relatively swift means of removing contaminants from shallow soils. The RAOs for soil excavation are established in Section 2.8.2.

- No Further Action Sites

  Cleanup has been completed, and confirmation sampling results indicate that contaminants are not present at levels that constitute adverse risk to human health or groundwater quality. Thus, no further remedial action is required.

- CERCLA-Exempt Sites

  The stains are the result of aircraft engine exhaust emissions and not subject to the provisions promulgated by CERCLA. The stains are subject to applicable RCRA and State of California laws and regulations, including those for protection of groundwater quality.

The 41 SCOU ROD Part 2 CERCLA sites and their preferred alternatives, removal actions, selected remedies, and remedial status are listed in Table 1-1.

Statutory Determinations

The selected remedies included in the SCOU ROD Part 2 attain the mandates of CERCLA Section 121 and, to the extent practicable, the NCP. The selected remedies for the VOC sites and waste oil tank and OWS sites are protective of human health and groundwater, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost effective. To the extent practicable, the remedies for the VOC and waste oil tank and OWS sites utilize permanent solutions and satisfy the statutory preference for treatment as a principal element to reduce toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants. SVE removes and destroys or consolidates contaminants through vapor treatment, and bioventing destroys contaminants. The excavation remedy is a permanent solution, but attains the treatment preference only if the soil is treated at the off-site disposal facility.

A statutory review will be conducted every 5 years until contaminant concentrations are reduced to levels that no longer pose an adverse risk to public health and groundwater. The initial review for Castle Airport was conducted in 1998 and focused primarily on groundwater remediation at Operable Unit (OU)-1 and OU-2. The next review is scheduled for 2003 and will include an evaluation of the remedies implemented at applicable SCOU sites.

Table 1-1 SCOU ROD Part 2 Site List

Site Name	Preferred Alternative	Removal Action	Selected Remedy[1]	Remedial Status
Building 51[2]	SVE	SVE initiated in August 2001	SVE	SVE in progress
Building 52[2]	SVE	SVE initiated in August 2001	SVE	SVE in progress
Building 53[2]	SVE	SVE initiated in August 2001	SVE	SVE in progress
Building 54[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Building 1253[2]	SVE	SVE initiated in August 2001	SVE	SVE in progress
Building 1260[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Building 1266[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Building 1314[4]	SVE	SVE initiated in August 1996	SVE	SVE in progress
Building 1350	SVE and bioventing	SVE initiated in October 2001	SVE	SVE in progress
Building 1709	SVE		SVE	Site is in design phase
Building 1762	SVE	SVE initiated in December 2001	SVE	SVE in progress
Discharge Area 4[4]	SVE	SVE initiated in August 1996	SVE and excavation and disposal	SVE in progress
Discharge Area 5	SVE, excavation, IR, and bioventing	SVE initiated in October 2001	SVE, excavation, bioventing	SVE in progress
ETC5[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Hangar F-4	SVE		SVE	Site is in design phase
SA B3[3]	SVE	SVE initiated in August 2001	SVE	SVE in progress
Sanitary Sewer 2	SVE		SVE	Site is in design phase
Sanitary Sewer 4	SVE	SVE initiated in August 2001	SVE	SVE in progress
Structure 55[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Structure T66[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
Structure T67[3]	SVE and bioventing	SVE initiated in August 2001	SVE	SVE in progress
SWMU 4.3	Excavation and disposal		Excavation and disposal, bioventing	To be completed
SWMU 4.4	Excavation and disposal		Excavation and disposal	To be completed
SWMU 4.6	Excavation and disposal		Excavation and disposal	To be completed

SWMU 4.16	Excavation and disposal		Excavation and disposal	To be completed
SWMU 4.21	Excavation and disposal		Excavation and disposal, bioventing	To be completed
SWMU 4.22	Excavation and disposal		Excavation and disposal	To be completed
Building 1532	SVE		NFA	NFA based on SVE Turn-on and Remediation Test (START)
Building 1541[5]	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.5	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.7	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.8	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.14	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.15	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.17	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.18	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.23[5]	Excavation and disposal		NFA	Excavation and disposal completed
SWMU 4.29	Excavation and disposal		NFA	Additional sampling confirmed no adverse risk to human health and the environment
PCB-4	ICs	Excavation in 2002	NFA	RAOs achieved
PCB-5	ICs	Excavation in 2002	NFA	RAOs achieved
PCB-6	ICs		NFA	Additional sampling confirmed no adverse risk to human health and the environment

[1] Changes between the Preferred Alternative and the Selected Remedy are discussed in the site-specific presentations (Section 2.8) and Documentation of Significant Changes (Section 2.14).
[2] indicates facilities in the Building 51 Group
[3] indicates facilities in the Building 54 Group
[4] indicates that Discharge Area 4 is associated with Building 1314
[5] indicates that Building 1541 and SWMU 4.23 are linked

AST aboveground storage tank
ETC Earth Technology Corporation
IC institutional control
IR intrinsic remediation
NFA no further action
OWS oil/water separator
PCB polychlorinated biphenyl
RAO remedial action objective
SVE soil vapor extraction
SWMU solid waste management unit

ROD Data Certification Checklist

The following information is included in Section 2.0, Decision Summary of this ROD.

- Chemicals of Concern (COCs) (Section 2.6.1.1, Human Health Risk Assessment [HHRA] Contaminants of Potential Concern [COPCs], and Table 2-1, COPCs) and their respective concentrations (Section 2.8, Site Characteristics, Site COCs and RAOs subsection for each site)

- Baseline risk to human health posed by COCs, (Section 2.6.1, HHRA, Table 2-4, HHRA Results for SCOU ROD 2 Sites, Section 2.8, Site Characteristics, HHRA subsection for each site)

- Potential risk to groundwater posed by COCs, (Section 2.6.2, Environmental Assessment and Section 2.8, Site Characteristics, Environmental Assessment subsection for each site)

- Cleanup levels established for COCs and the basis for these levels, (Section 2.7, Castle Airport RAOs, and Tables 2-8, 2-9, 2-10, HHRA RAOs and Water Quality Site Assessment [WQSA] Thresholds for VOCs, SVOCs, and Metals, respectively, Section 2.8, Site Characteristics, Site COCs and RAOs subsection for each site)

- Source materials constituting principal threats and how they are addressed (Section 2.11, Principal Threat Waste, and Section 2.12, Selected Remedy)

- Current and potential future land and groundwater use assumed by the HHRA (Section 2.6.1.2, Exposure Assessment) and Environmental Assessment (Section 2.6.2, Environmental Assessment),

- Potential future land and groundwater use available as a result of the selected remedies (Section 2.12, Selected Remedy)

- Cost estimates for selected remedies (Table 2-15, Evaluation of Selected Remedy, VOC Sites, and Table 2-16, Evaluation of Selected Remedy, Waste Oil Tank and OWS Soil Sites)

- Criteria for remedy selection (Section 2.10, Comparative Analysis; Table 2-13, Comparative Analysis for the VOC Sites; and Table 2-14, Comparative Analysis for the Waste Oil Tank and OWS Sites).

Page numbers for the sections, tables and figures referenced in the ROD Data Certification Checklist can be found in the Table of Contents. Additional supporting information can be found in the Administrative Record for Castle Airport, the index for which is provided in Appendix B.

Authorizing Signatures

Signature sheet for the SCOU ROD Part 2 for 53 sites located at the former Castle AFB, California. The U.S. EPA and the State of California EPA, Department of Toxic Substances Control (DTSC) had an opportunity to review and comment on the SCOU ROD Part 2, and their concerns were addressed.

Albert F. Lowas, Jr.
Director, Air Force Real Property Agency
U.S. Air Force

June 18, 2003
Date

Deborah Jordan
Chief, Federal Facilities and Site Cleanup Branch
Region IX, U.S. Environmental Protection Agency

June 23, 2003
Date

Anthony J. Landis, P.E.
Chief, Northern California Operations
Office of Military Facilities
Department of Toxic Substance Control
California EPA

July 9, 2003
Date

2.0 DECISION SUMMARY

This decision summary presents an overview of site characteristics for Castle Airport and the 41 SCOU ROD Part 2 CERCLA sites, the alternatives evaluated for remedial action at the sites, and the detailed and comparative analysis of those alternatives. The decision summary concludes with identification of the selected remedies and the associated statutory determinations supporting the selected remedies.

This decision summary incorporates the format and content recommended by U.S. EPA guidance (U.S. EPA, 1999). The recommended outline headings from the guidance and corresponding subsections of this decision summary are listed below.

U.S. EPA Recommended Subsection	Decision Summary Subsection
1. Site Name, Location, and Description	2.1
2. Site History and Enforcement Activities	2.2
3. Community Participation	2.3
4. Scope and Role of Operable Unit	2.4
5. Site Characteristics	2.8
6. Current and Potential Future Land and Resource Uses	2.5
7. Summary of Site Risks	2.6
8. Remedial Action Objectives	2.7
9. Description of Alternatives	2.9
10. Comparative Analysis of Alternatives	2.10
11. Principal Threat Waste	2.11
12. Selected Remedy	2.12
13. Statutory Determinations	2.13
14. Documentation of Significant Changes	2.14

The adjustments to the order of recommended sections were incorporated into this decision summary to accommodate the inclusion of site-specific risk information and remedial action objectives in the Site Characteristics subsection. Details regarding the two proposed plans applicable to the SCOU, the *SCOU Proposed Plan* (WPI, 1997) addressing all 233 SCOU sites, and the *SCOU Revised Proposed Plan* (Earth

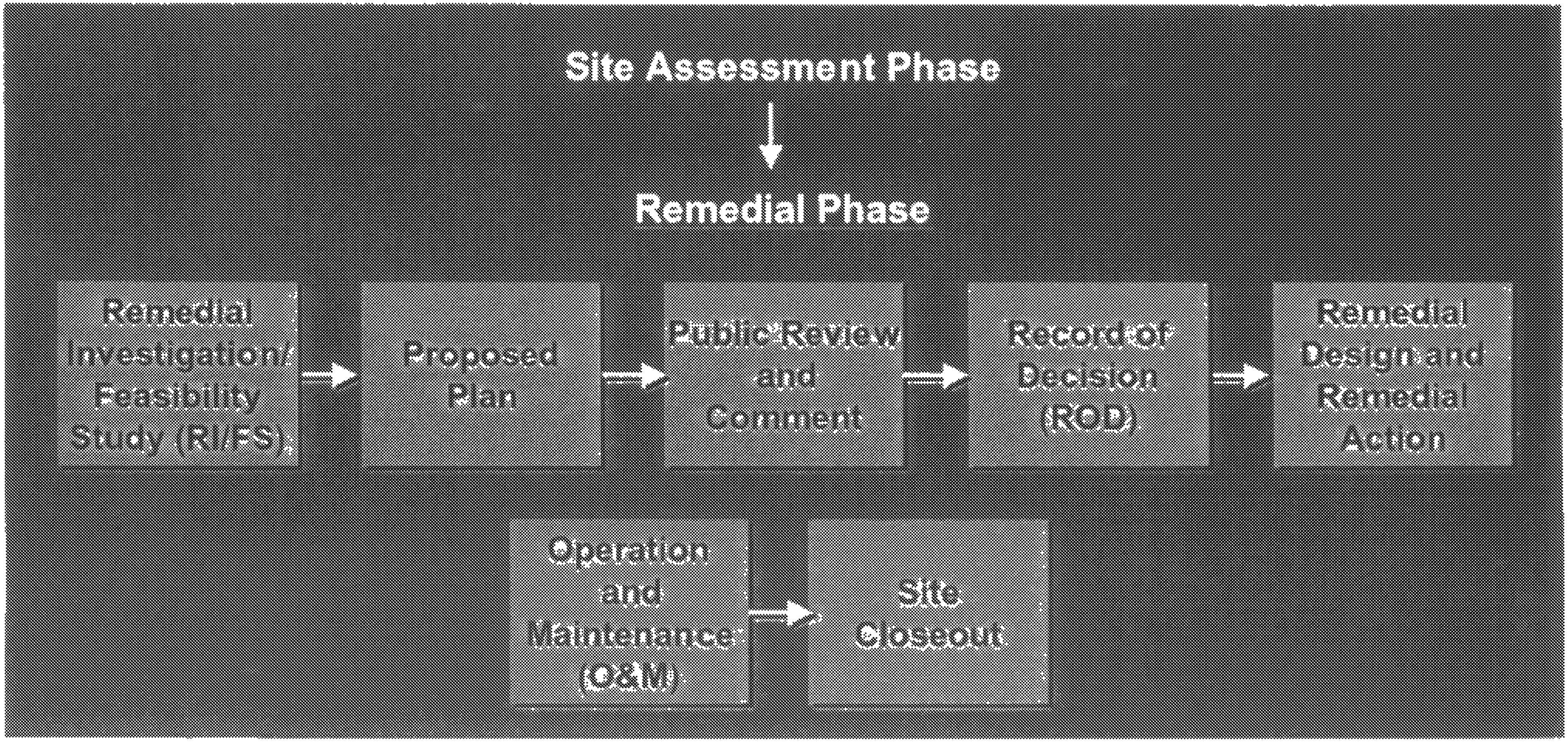
Tech, 2001) addressing revisions to 50 of the 53 sites documented in this ROD, are provided in Section 2.3, Community Participation.

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Castle Airport is located in Merced County, California (Figure 1-1). The site covers an area of 2,777 acres and includes a runway and airfield, industrial areas, housing, recreational facilities, and several noncontiguous parcels. Neighboring communities include Atwater, located immediately to the west, Winton, located to the northwest, and Merced, located approximately five miles southeast of Castle Airport.

Castle Airport was subject to the provisions of CERCLA upon authorization of SARA in 1986. The CERCLA remedial process from site assessment through closure is summarized on Figure 2-1. Castle Airport was proposed for the National Priorities List (NPL) of hazardous waste sites on July 22, 1987. The former base was officially listed as an NPL site on November 21, 1989, and has been assigned U.S. EPA identification CA3570024551. Remedial activities at Castle Airport are funded through the Department of Defense as a component of Base Realignment and Closure (BRAC) Environmental Cleanup. The U.S. EPA, California DTSC, and the U.S. Air Force signed an interagency agreement, known as the CAFB Federal Facility Agreement (FFA) on July 21, 1989. The FFA is a legal document that outlines the CERCLA and state requirements with which the Air Force must comply during investigation and cleanup at Castle Airport. The FFA also documents the regulatory agency enforcement authority. The Air Force, U.S. EPA, DTSC and the California Regional Water Quality Control Board (RWQCB) Central Valley Region comprise the BRAC Closure Team (BCT), with the Air Force serving as lead agency. Decisions regarding site assessment and cleanup at Castle Airport are agreed upon by the BCT.

The SCOU ROD Part 2 sites are categorized into four site types based upon the nature, origin, and presence of contaminants. The four site types are described below. Site locations are provided on Plate 1 in Appendix A.



CERCLA Process

Castle Airport
SCOU ROD Part 2

Figure 2-1

- VOC sites (21 sites) are impacted primarily with VOCs and fuel hydrocarbons resulting from former aircraft maintenance and support activities. These sites include industrial buildings, waste discharge areas, sanitary sewer segments, storage areas, mechanical shops and hangars.
- Waste Oil Tank and OWS sites (6 sites) impacted with fuel hydrocarbons, SVOCs, and metals, resulting from storage, handling or treatment of wastes. These sites include oil water separators, grease traps and storage areas.
- NFA sites (14 Sites), where contaminants are not present at levels constituting adverse threat to human health or groundwater quality. These site are predominantly former OWSs, but include a former X-ray shop, a former corrosion control facility, and three former transformer locations.
- CERCLA-Exempt sites (12 sites), runway stains resulting from aircraft engine emissions.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Castle Airport began as a military air base in December 1941 to train Army aircrews during World War II. The Strategic Air Command (SAC) assumed responsibility for the base in 1946. The base was occupied by the 93rd Bombardment Wing until closure in September 1995. Fuels, primarily jet propellant type 4 (JP-4), solvents, and chemicals were used at the base since the 1940s. Municipal and chemical wastes were also generated as a result of maintenance operations, fuel management, fire training, and other base activities. In the 1950s, expanded industrial activities related to the SAC mission resulted in increased waste generation rates.

Originally, aircraft maintenance was conducted in two hangars (Buildings 47 and 51) and the machine shop (Building 52) located on the southwestern side of Apron Avenue. Activities associated with Building 52 included metal plating and processing and jet engine maintenance. Building 52 was demolished in 1977. In 1955, an additional parking apron, hangar (Building 1550), and other structures were added to support the newly arrived 456th Fighter Interceptor Squadron. Building 1550 has been used extensively for industrial activities. Buildings 1253 and 1260 were built in the late 1970s and assumed the majority of the industrial activities previously performed in Building 52.

Following the sampling of several water production wells in 1978, the Air Force determined that groundwater beneath Castle Airport was contaminated with trichloroethene (TCE) and other VOCs. During routine sampling of wells in 1980, trace levels of TCE were detected in the four base water production wells. Consequently, seven test wells were installed by the Air Force to investigate the shallow hydrostratigraphic zone (HSZ) (Engineering Science, 1983). The results of this investigation prompted the Air Force to construct a new deep HSZ aquifer supply well (PW10) and provided the impetus for the Air Force's aggressive strategy to address groundwater contamination under the Castle Airport Installation Restoration Program (IRP). This strategy led to the initiation of groundwater cleanup actions designed to control contaminant migration and to protect human health and the environment.

The initial phase of the IRP at Castle Airport was conducted in 1981, and 35 potential contaminant source sites were identified (Engineering Science, 1983). Additional investigation confirmed and partially delineated the extent of TCE in groundwater (Weston, 1985).

In March 1984, the RWQCB issued Cleanup and Abatement Order Number 84-027. This order required Castle Airport to provide users of the base water supply and contaminated off-base wells with additional sources of potable water. Castle Airport was required to implement remedial measures to mitigate groundwater contamination and prevent future groundwater degradation. Groundwater pump-and-treat systems have been installed to control plume migration and to remediate contaminated groundwater. Final decisions for groundwater remediation are documented in the *Comprehensive Basewide (CB) ROD Part 1* (U.S. Air Force [USAF], 1997).

In September 1984, an additional field investigation included the installation of 27 monitoring wells and 11 unsaturated zone lysimeters to determine the presence of groundwater contamination and perched water zones (Weston, 1985). This investigation determined that the soils and sediments at the majority of the sites had not been significantly affected, but that groundwater needed further evaluation. Significant TCE concentrations were detected in the central or Main Base Sector (MBS). The final report of this field investigation recommended additional investigations of the landfill, fire training areas, fuel spills, and disposal areas, and also further evaluation of the TCE plume in the MBS.

Investigation of the landfills, fuel discharges, and disposal areas consisted of monitoring soil organic vapor (SOV) at 205 points, drilling 48 soil borings, installing 27 monitoring wells and five lysimeters, and conducting two rounds of groundwater sampling. This investigation was completed in April 1987, and the final report was issued in August 1988. The investigation further refined the distribution of TCE in groundwater, and identified seven previously unknown fuel leaks (Weston, 1988).

Phase I of the RI started in August 1988 and included the installation of 63 additional monitoring wells in the upper and lower HSZ of the shallow aquifer and nine monitoring wells in the confined (CF) deep HSZ aquifer (IT Corp, 1990). In June 1989, Phase II of the RI was initiated and involved two rounds of groundwater sampling of 160 wells. Additionally, 77 soil borings were drilled and sampled to assist in future characterization of various sites. Two rounds of groundwater level measurements were also completed, and 15 short-term (4-hour) aquifer-pumping tests were conducted. Phase II of the RI field activities was completed in February 1990 (IT Corp, 1990). The Phase II RI results provided refined delineation of the groundwater plume and aquifer characteristics.

Phase III of RI field activities began in March 1990, continued through May 1991 and included quarterly groundwater sampling and analysis, 30-day aquifer tests, a preliminary site assessment of the Castle Vista landfills, six rounds of groundwater level measurements, and a sewer line television camera survey. The results of the Phase III RI provided data allowing for design of the OU-1 groundwater remedy (PRC, 1992).

In May of 1991, IT Corporation performed a limited records search and identified basewide TCE source areas (IT Corp, 1991). The records search focused on gathering information about the use, storage, and disposal of TCE and other contaminants. This investigation identified several new TCE source areas. The Contaminant Source Assessment (CSA) included record searches, personnel interviews, and reviews of engineering drawings and aerial photographs (JEG, 1992). An additional 39 locations and 24 solid waste management units (SWMUs) were identified for further investigation. In 1994, the *Environmental Impact Statement (EIS)* identified 11 additional potential contaminant source areas (Earth Tech, 1994).

The basewide SCOU RI/FS was initiated in 1993. A total of 233 sites were investigated during SCOU RI activities. Investigation methods included geophysical surveys and soil and soil gas sampling and analysis. The summary of the SCOU RI/FS was submitted for agency review in February 1995. The 1995 RI/FS was rejected by the agencies and the Air Force was requested to initiate further investigation of 40 SCOU sites. The updated draft final *RI/FS* was submitted for agency review in January 1997 and finalized in May 1997 (JEG, 1997a). However, based on further agency comment, it was determined that 24 of the SCOU sites required further evaluation before a remedial alternative could be selected and one site, fire training area 1 (FTA1), required a CERCLA evaluation of alternatives for metal and dioxin contamination.

Sites that required further evaluation fell into two categories, further action data gap sites and technical and economic evaluation (T&E) sites. These sites were either not sampled as part of the RI, or the data collected were not adequate to fully determine the extent, concentrations, or impact of site contamination. There were a total of 12 further action data gap sites and 12 T&E sites. To address needs for additional data, the Air Force completed data gap and T&E investigations in late 1997 and early 1998. The results were presented in the *Data Gap Investigation Report*, which was completed in 1999 (JEG, 1999). Sites evaluated in the *Data Gap Investigation Report* that are addressed by this ROD include Discharge Area 5, Building 1541, Sewer Segment 2, and Sewer Segment 4.

An SVE decision study was performed at eight sites in order to confirm the presence of VOCs (almost exclusively TCE and tetrachloroethene [PCE]) in excess of levels protective of groundwater, and to field test the viability of SVE as a remedial alternative. All eight SVE decision study sites are addressed in this ROD and include the Building 51 Group, Sewer Segment 4, Building 1350, Building 1532, Building 1709, Building 1762, Discharge Area 5, and Aircraft Hangar F-4. The presence of VOCs above levels protective of groundwater was confirmed at each site. Field data indicated that the conditions at each site were conducive to SVE as a remedial alternative (Earth Tech, 2000a).

2.3 COMMUNITY PARTICIPATION

The Community Relations Plan (CRP) for Castle Airport was completed in 1990 and updated annually by Castle Airport's Office of Public Affairs from 1994 through 1998. The current CRP is dated October 1998. The DTSC Public Participation Policy requires that the CRP be reviewed and/or revised at least every two years for a long-term project. The Air Force policy is that the CRP be reviewed annually and updated as needed, but at a minimum, within five years of the last update. Until the September 2002 signing of the SCOU ROD Part 1, there had not been sufficient change in the program to warrant an update. Pursuant to the signing of the SCOU ROD Part 1, the CRP will be updated in 2003. Consistent with the Base's CRP, the Air Force established a Restoration Advisory Board (RAB) composed of U.S. EPA, DTSC, RWQCB, the Air Force, Merced County, and local representatives from adjacent communities. The RAB meets on a regular basis to provide the community representatives with information on recent events. Castle Airport publishes and distributes newsletters to inform the community of recent activities.

After completion of the *SCOU RI/FS*, the *SCOU Proposed Plan* (WPI, 1997) was submitted August 15, 1997 to the RAB and the public for a 30-day comment period. The *SCOU Proposed Plan* provided a brief overview of the information contained in the *SCOU RI/FS* and listed the proposed remedial alternatives for each of the 233 SCOU sites. Responses to comments received during the public hearings and comment period for the *SCOU Proposed Plan* are included in the Responsiveness Summary of the *SCOU ROD Part 1*, which includes 169 SCOU sites requiring no further action.

The *SCOU Proposed Plan* included some sites for which the proposed remedies were conditional on additional data collection or technical evaluation. In addition, at the time of the *SCOU Proposed Plan*, the VOC RAO for groundwater protection had not yet been established. The Air Force issued another proposed plan, the *SCOU Revised Proposed Plan* (Earth Tech, 2001), which specifically addressed the proposed remedies for 50 of the 53 SCOU sites included in this ROD. The *SCOU Revised Proposed Plan* was issued to reiterate or establish the proposed remedies for the 50 original SCOU ROD Part 2 sites after the data and technical evaluation conditions were addressed and the VOC RAO for groundwater protection had been established. The other three SCOU ROD Part 2 sites (PCB-4, PCB-5, PCB-6) had been included in the *SCOU Proposed Plan* and were slated for the SCOU ROD Part 1. The sites were moved to SCOU ROD Part 2 because, after publication of the *SCOU Revised Proposed Plan*, agency comments were received on the SCOU ROD Part 1 that required additional characterization at the three sites.

The *SCOU Revised Proposed Plan* was submitted February 12, 2001 to the RAB and the public for a 30-day comment period, and a public hearing was held at the Atwater City Hall Council Chambers on February 21, 2001. Responses to public comments on the *SCOU Revised Proposed Plan* are presented in the Responsiveness Summary provided in Section 3 of this document.

This SCOU ROD Part 2 presents the selected remedies for 41 of the 233 SCOU sites at Castle Airport in Merced County, California. In addition, this ROD documents 12 SCOU sites as exempt from CERCLA. The remedies for the 41 sites were chosen in accordance with CERCLA, as amended by SARA and the NCP. The remedial decisions are based on informational documents in the Administrative Record (AR). Publicly accessible copies of the AR are available at Castle Airport and the Merced County Library. The availability of the AR was indicated to the public in the SCOU Proposed Plans. A summary of the AR is provided in Appendix B. The public participation requirements of CERCLA Sections 113(K)(2)(B)(I-v) and 117 have been substantively satisfied.

2.4 SCOPE AND ROLE OF THE OPERABLE UNIT

Operable units are used to group sites with similar contaminants and site conditions. The SCOU was designated in order to identify, investigate, and remediate surface and subsurface soil contamination that may serve as a direct threat to human health or the environment or a potential source of air, surface water or groundwater contamination. A total of 233 SCOU sites were identified and investigated. The SCOU RI/FS was initiated in 1993 and finalized in 1997. The objectives of the SCOU RI/FS were to:

- Investigate the nature and extent of vadose zone contamination from the surface to a depth of approximately 60 feet bgs
- Assess the risks that contaminated soils pose to human health and water quality
- Evaluate the feasibility of various remedial action alternatives
- Recommend preferred alternatives.

The 233 SCOU sites will be addressed in four RODs. *SCOU ROD Part 1* (WPI, 2002), also referred to as the NFA ROD, was finalized on September 9, 2002. *SCOU ROD Part 1* addresses 169 sites, 137 of which are NFA sites and 32 of which are contaminated with petroleum hydrocarbons and are excluded from CERCLA based on the definition of a hazardous substance (42 U.S.C. 9601.14). The 137 NFA sites were found to have no adverse risk to human health and the environment or were addressed by cleanups completed via the removal action program. The 32 excluded sites will be addressed separately under RCRA and State of California laws and regulations pertaining to underground storage tanks (USTs) and protection of groundwater quality. The SCOU ROD Part 2 addresses 53 SCOU sites, 27 of which require active remediation, 14 of which are NFA sites, and 23 of which are aircraft runway stains that are excluded from CERCLA based on the definition of a release (42 U.S.C. 9601.22). The 12 excluded sites will be addressed separately under RCRA and State of California laws and regulations pertaining to protection of groundwater quality. The Landfill ROD, scheduled for completion in 2003, will address 8 sites (Landfill 4, Landfill 5, and six associated soil sites). Due to institutional controls and other issues that required an extended timeframe to resolve, the remaining three SCOU sites (FTA-1, ETC-8, ETC-10) will be addressed in the CB ROD Part 2.

The groundwater operable unit at Castle Airport is referred to as the CB Part 1 and the selected remedies for groundwater contamination were addressed in the *CB ROD Part 1*, completed in 1997 (USAF, 1997). The *CB ROD Part 1* incorporated prior groundwater RODs for OU-1 and OU-2, which were previous designations for groundwater operable units at Castle Airport. Ultimately, the *CB ROD Part 1* and the three SCOU RODs will be consolidated into the CB ROD Part 2 in order to confirm that the separate remedies for the soil and groundwater operable units are protective of human health and the environment. The CB ROD Part 2 will serve as the final remedial decision document for Castle Airport and will address any issues required for the protection of human health and the environment that are not already covered by the *CB ROD Part 1*, *SCOU ROD Part 1*, SCOU ROD Part 2, and the Landfill ROD. The CB ROD Part 2, in addition to documenting the basewide remedial actions for Castle Airport, will specifically incorporate remedial action decisions required as a result of the ecological risk assessment. The CB ROD Part 2 is scheduled for completion in 2004. A list of all 233 SCOU sites, categorized according to decision document and selected remedy, is provided on Table 2-1.

Table 2-1 SCOU Site List

SCOU ROD Part 1 (169 Sites)							
No Further Action (137 Sites)							
1.	Building 23	31.	Disposal Pit 10 (LF5)	61.	N8	122.	SWMU 4.20
2.	Building 47	32.	ETC 2	62.	N9	123.	SWMU 4.24
3.	Building 84	33.	ETC3	63.	N10	124.	SWMU 4.25
4.	Building 541	34.	ETC6	64.	PCB 1, 2, 3	125.	SWMU 4.26
5.	Building 545	35.	ETC7	65.	PCB 7	126.	SWMU 4.27
6.	Building 547	36.	ETC11	66.	PCB 8	127.	SWMU 4.28
7.	Building 871	37.	ETC12	67.	PCB 9	128.	SWMU 4.30
8.	Building 1182	38.	ETC13	68.	Sanitary Sewer 1	129.	SWMU 4.31
9.	Building 1204	39.	Firing Range	69.	Sanitary Sewer 3	130.	SWMU 4.32
10.	Building 1205	40.	FTA2	70.	Sanitary Sewer 5	131.	SWMU 4.33
11.	Building 1207	41.	H1	71.	Sanitary Sewer 6[3]	132.	SWMU 4.34
12.	Building 1319	42.	H2	72.	Sanitary Sewer 7[3]	133.	SWMU 4.35
13.	Building 1335	43.	H3	73.	Sanitary Sewer 9	134.	SWMU 4.36
14.	Building 1344	44.	Hangar F-1	74.	Stains 1 to 32	135.	SWMU 4.37
15.	Building 1404	45.	Hangar F-2	75.	Storage Area B1	136.	SWMU 4.38
16.	Building 1405	46.	Hangar F-3	76.	Storage Area B2	137.	UFL4
17.	Building 1529	47.	Hangar F-5	77-108	Storage Area B4		
18.	Building 1550[3]	48.	Hangar F-6	109.	Storm Drain System		
19.	Building 1562	49.	HWS4	110.	Structure 1201		
20.	CVLFA	50.	IWL	111.	Structure 1206		
21.	CVLFB	51.	LG1	112.	Structure 1571		
22.	DBF	52.	Landfill 1	113.	Structure T85		
23.	Discharge Area 2	53.	Landfill 2	114.	SWMU 4.1		
24.	Discharge Area 3	54.	Landfill 3	115.	SWMU 4.2		
25.	Discharge Area 8	55.	N2	116.	SWMU 4.9		
26.	Disposal Pit 1 (LF1)	56.	N3	117.	SWMU 4.10		
27.	Disposal Pit 2 (LF1)	57.	N4	118.	SWMU 4.11		
28.	Disposal Pit 3 (LF1)	58.	N5	119.	SWMU 4.12		
29.	Disposal Pits 4A/4B	59.	N6	120.	SWMU 4.13		
30.	Disposal Pit 7 (LF5)	60.	N7	121.	SWMU 4.19		
Petroleum Hydrocarbon Only Sites NFA Under CERCLA, must meet RCRA and State requirements (32 Sites)							
1.	Building 59[4]	10.	Building 951	19.	FTA3*	28.	Sanitary Sewer 8[4]
2.	Building 79[4]	11.	Building 1324	20.	Fuel Spill 1	29.	Structure T61/HWS1[7]
3.	Building 175	12.	Building 1325/HWS3	21.	Fuel Spill 2	30.	UFL1[6]
4.	Building 325	13.	Building 1560	22.	Fuel Spill 3	31.	UFL2
5.	Building 508[4]	14.	Building 1865/1868	23.	Fuel Spill 4	32.	UFL3
6.	Building 551*	15.	Discharge Area 1/TCC1	24.	H4[6]		
7.	Building 909[4]	16.	Discharge Area 6[4]	25.	JP4 Fuel Line		
8.	Building 917[4]	17.	Discharge Area 7[4]	26.	JP7		
9.	Building 950	18.	ETC4[7]	27.	PFFA[4]		

*Insignificant VOC contamination. An evaluation similar to the START Process will be accomplished to ascertain the potential impact to groundwater

SCOU ROD Part 2
(53 Sites)

Volatile Organic Compound Sites
Soil Vapor Extraction (21 Sites)

1.	Building 51[1]	7.	Building 1266[2]	13.	Discharge Area 5	19.	Structure 55[2]
2.	Building 52[1]	8.	Building 1314[5]	14.	ETC5[2]	20.	Structure T66[2]
3.	Building 53[1]	9.	Building 1350	15.	Hangar F-4	21.	Structure T67[2]
4.	Building 54[2]	10.	Building 1709	16.	SA B3[2]		
5.	Building 1253[1]	11.	Building 1762	17.	Sanitary Sewer 2		
6.	Building 1260[2]	12.	Discharge Area 4[5]	18.	Sanitary Sewer 4		

Waste Oil Tank and OWS Sites
Excavation and Off-site Disposal (6 Sites)

1.	SWMU 4.3	3.	SWMU 4.6	5.	SWMU 4.21		
2.	SWMU 4.4	4.	SWMU 4.16	6.	SWMU 4.22		

No Further Action Sites
(14 Sites)

1.	Building 1532	5.	SWMU 4.8	9.	SWMU 4.18	12.	PCB-4
2.	Building 1541[8]	6.	SWMU 4.14	10	SWMU 4.23[8]	13.	PCB-5
3.	SWMU 4.5	7.	SWMU 4.15	11.	SWMU 4.29	14.	PCB-6
4.	SWMU 4.7	8.	SWMU 4.17				

CERCLA-Exempt Sites
CERCLA-Exempt, must meet RCRA and State requirements (12 Sites)

1.	Stain 33	4.	Stain 36	7.	Stain 39	10.	Stain 42
2.	Stain 34	5.	Stain 37	8.	Stain 40	11.	Stain 43
3.	Stain 35	6.	Stain 38	9.	Stain 41	12.	Stain 44

LANDFILL ROD (8 Sites)

Landfill Sites
Zoned Capping with Institutional Controls (6 Sites)

1.	Disposal Pit 5 (LF4)	3.	Disposal Pit 8 (LF5)	5.	Disposal Pit 9 (LF5)	7.	Landfill 5
2.	Disposal Pit 6 (LF4)	4.	Disposal Pit 8A (LF5)	6.	Landfill 4	8.	Landfill 5 Trenches

CB ROD Part 2 (3 Sites)

1.	FTA-1	2.	ETC-10	3.	ETC-8		

[1] indicates facilities in the Building 51 Group
[2] indicates facilities in the Building 54 Group
[3] indicates facilities in the Discharge Area 8 Group
[4] indicates facilities in the Petroleum Fuel Farm Area Group
[5] indicates that Discharge Area 4 and Building 1314 are linked
[6] indicates that H4 and UFL1 are linked
[7] indicates that ETC4 and Structure T61/HWS1 are linked
[8] indicates that Building 1541 and SWMU 4.23 are linked

2.5 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The 53 SCOU ROD Part 2 sites are located within areas historically used for industrial purposes and are prescribed for future industrial reuse in the *Castle Airport Reuse Plan* (Joint Powers Authority [JPA], 1996). The reuse alternatives considered in the *Disposal and Reuse ROD* (Air Force Base Conversion Agency [AFBCA], 1995) are primarily associated with commercial aviation and related industrial support services. However, as a result of community dialogue generated through the RAB, future land uses will not be limited, if possible, as a result of site contamination. The intention of the Local Reuse Authority (LRA) is to maximize the area of Castle Airport available for unrestricted reuse. In this light, potential future reuses at Castle Airport would include residential reuse.

Land use within a two-mile radius of Castle Airport is urban and agricultural. Urban residential areas consisting of former base housing, trailer parks, and recently constructed residential suburban housing, are located west, south, and east of the base. Agricultural areas and rural farm residences are located to the north of the base.

Groundwater is currently pumped locally for irrigation and domestic uses, including use as municipal drinking water. Future groundwater uses are expected to remain the same with respect to type of use and increase with respect to quantity of use. The selected remedy to contain and remediate contaminated groundwater at Castle Airport is specified in the *CB ROD Part 1* (USAF, 1997) and is being implemented. Monitoring of local domestic and municipal supply wells, as well as local irrigation wells, is conducted pursuant to the *CB ROD Part 1*. Where necessary, alternative or treated water supplies have been, and will continue to be, provided for the protection of human health. The *CB ROD Part 1* selected remedy is expected to result in unrestricted reuse when completed.

2.6 SUMMARY OF SITE RISKS

As part of the RI/FS process, the SCOU sites were assessed for potential risk to human health and groundwater quality. The potential risk to human health was evaluated according to U.S. EPA *Risk Assessment Guidance for Superfund* (U.S. EPA, 1989) and the risk to groundwater quality was evaluated using WQSA methodology (RWQCB, 1992). Risk to human health was reevaluated in 2001 (JEG, 2001) to account for updated risk and exposure factors established by the U.S. EPA and California DTSC.

Assessment of potential impact to ecological receptors was also performed for the SCOU sites; however, ecological concerns will be addressed and finalized in the CB ROD Part 2. The CB ROD Part 2 will also integrate the *CB ROD Part 1* for groundwater with the three SCOU RODs (Part 1, Part 2 and Landfills) in order to establish and document the basewide remedial actions necessary for the protection of human health and the environment.

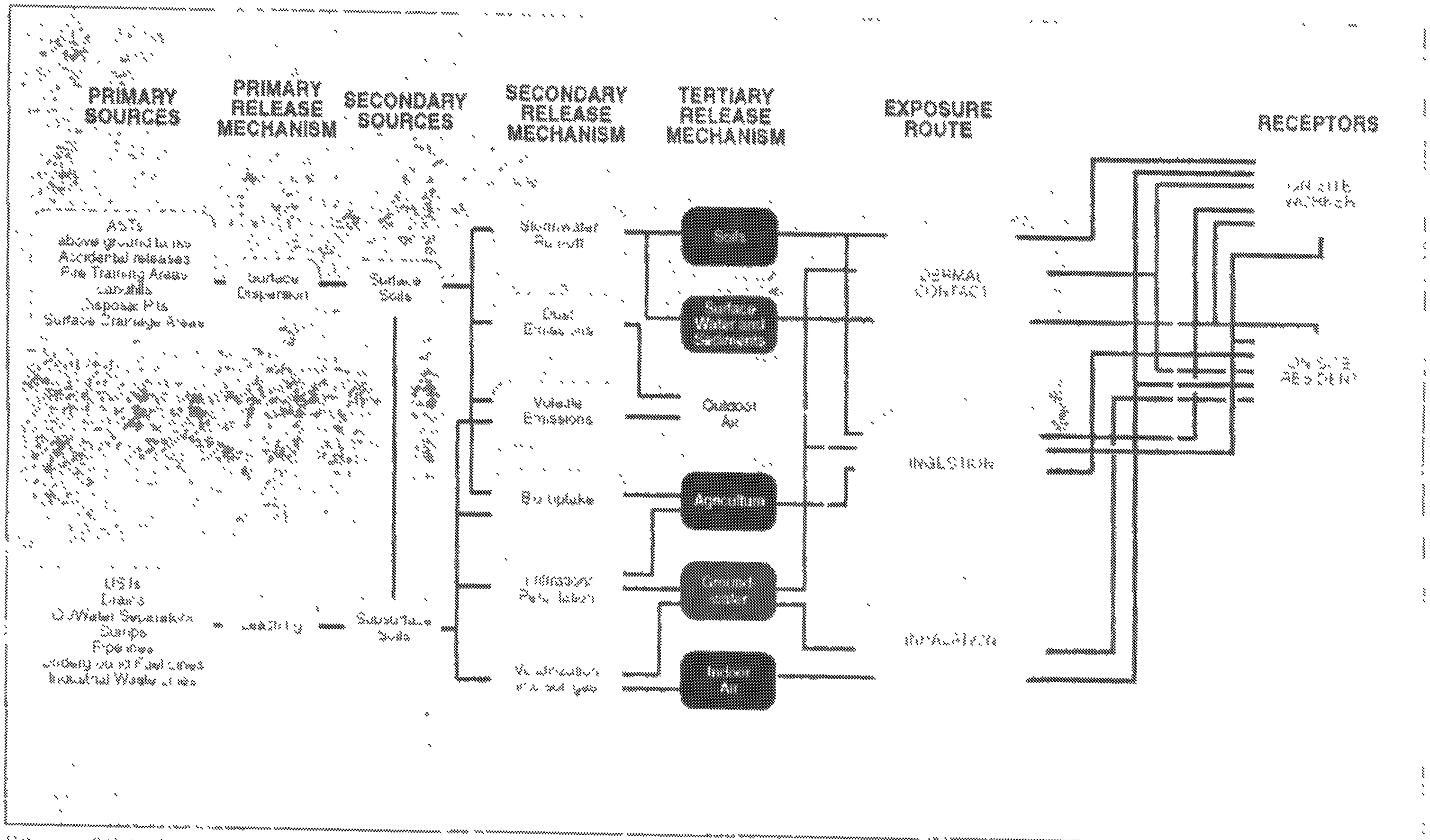
2.6.1 HUMAN HEALTH RISK ASSESSMENT

The baseline HHRA estimates what risks the sites pose if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline HHRA for the SCOU ROD Part 2 sites. The HHRA was originally completed as a component of the *SCOU RI/FS HHRA* (JEG, 1997b). Subsequent data gap investigation results were also incorporated into the *HHRA* (JEG, 1999). The *SCOU HHRA* was updated in 2001 to incorporate revisions to toxicity values, slope factors, and reference doses that had occurred since initial preparation of the *HHRA* (JEG, 2001). The update is included in Appendix C.

Potential receptors and exposure pathways were identified during the HHRA and are shown on Figure 2-2. The magnitude of exposure was determined by estimating the amount, or concentration of the contaminant at the point of contact over a specified time period, or exposure duration, as well as the dose, or intake, of the contaminant. Age-adjusted values for soil ingestion, inhalation rates, and dermal exposure were used to determine carcinogenic risk, while non-carcinogenic hazard was conservatively calculated based on exposure to a child. Cancer risks and non-cancer hazard indices were calculated using U.S. EPA guidance (U.S. EPA, 1989). The HHRA considered both residential and industrial/occupational land use scenarios. Generally, the results of the residential risk scenario are used in the remedial action decision process for SCOU sites in order to protect human health, maximize reuse potential, and avoid institutional controls that may otherwise be required. The following subsections provide a summary of the HHRA.

2.6.1.1 HHRA Contaminants of Potential Concern

In order to quantify site risk, it was necessary to identify the chemicals of potential concern (COPCs). A total of 104 analytes were identified in soil samples collected during the SCOU RI. Reported chemicals



Conceptual Exposure Pathways

Castle Airport

Figure 2-2

included inorganics (metals and gross alpha and beta radiation), VOCs, SVOCs, pesticides, herbicides, and total petroleum hydrocarbons (TPH) as gasoline, diesel, and JP-4. All organic analytes detected in the SCOU RI were forwarded for consideration in the risk assessment. Inorganic analytes were evaluated relative to naturally occurring background levels. Only inorganic analytes considered to be anthropogenic and detected above background levels were included in the risk assessment. The determination of anthropogenic origin is presented in detail in the *SCOU RI/FS HHRA* (JEG, 1997b). Not all analytes were selected as COPCs for evaluation in the risk assessment. The U.S. EPA provides several rationales for excluding chemicals from consideration as COPCs in the risk assessment. These include the following:

- Reported concentrations of the chemical are false positives (e.g., due to laboratory contamination or due to field cross contamination).
- The chemical is an essential human nutrient and is present at concentrations that are unlikely to cause adverse health effects.
- Reported concentrations of the chemical are representative of naturally occurring levels.
- The analyte (such as TPH) represents a group of compounds, thus the data are not suitable to quantitative risk assessment. However, detected constituents comprising the group of compounds can be assessed individually.

As a result, certain detected analytes were excluded as COPCs. Calcium, copper, iron, magnesium, sodium, and zinc were eliminated on the basis that they are essential nutrients at concentrations detected. Total petroleum hydrocarbons (as gasoline and diesel) and gross alpha and beta radiation were eliminated because they represent classes of compounds, the data for which are not suitable for risk assessment. However, specific TPH constituents detected during the *SCOU RI/FS* as a result of VOC or SVOC analyses were included in the risk assessment. Gross alpha and beta radiation were not detected at any of the sites included in this ROD.

Based on the above evaluations, the HHRA identified 95 chemicals (13 inorganic and 82 organic) as COPCs in soils at Castle Airport. The COPCs are listed on Table 2-2. Some of the COPCs in soils at Castle Airport are considered potential human carcinogens. However, since suspected carcinogens may cause adverse noncarcinogenic health effects, both carcinogenic risks and noncarcinogenic health hazards were evaluated. Identification of COCs based on human health risk is discussed in Section 2.6.1.4, Risk Characterization.

Table 2-2
Contaminants of Potential Concern

COPCs fom HHRA	COPC for Vadose Zone Screening	COPCs from HHRA	COPC for Vadose Zone Screening
Inorganic Compounds			
Arsenic	x	Mercury	
Barium		Molybdenum	x
Beryllium	x	Nickel	x
Cadmium	x	Selenium	x
Chromium	x	Silver	x
Cobalt	x	Thallium	
Lead	x		
Organic Compounds			
Acenaphthene		1,3-Dichlorobenzene	
Acenaphthylene		1,4-Dichlorobenzene	x
Anthracene	x	1,2-Dichloroethane	
Benzene	x	cis-1,2-Dichloroethene	x
Benzo(a)anthracene	x	Dieldrin	
Benzo(a)pyrene	x	Diethyl phthalate	
Benzo(b)fluoranthene	x	2,4 Dimethylphenol	
Benzo(ghi)perylene		2,4-Dinitrotoluene	
Benzo(k)fluoranthene		Endrin	
Bis(2-ethylhexyl) phthalate		Ethylbenzene	x
2-Butanone		Fluoranthene	x
Butyl benzyl phthalate		Fluorene	
n-Butylbenzene		Heptachlor epoxide	
sec-Butylbenzene		Hexachlorobutadiene	
t-Butylbenzene		Indeno(1,2,3-cd)pyrene	
Carbon tetrachloride	x	Methylene chloride	
α-Chlordane		2-Methylnaphthalene	
γ-Chlordane		2-Methylphenol	
4-Chloroaniline		4-Methylphenol	
Chlorobenzene		Naphthalene	x
Chloroform	x	Polychlorinated biphenyls	
4-Chlorotoluene		Pentachlorophenol	
Chrysene	x	Phenanthrene	x
Isopropylbenzene (Cumene)		Phenol	
Isopropyltoluene (*p*-Cymene)		n-Propylbenzene	
Dichlorodiphenyldichloroethane		Pyrene	
Dichlorodiphenyldichloroethene		Styrene	
Dichlorodiphenyltrichloroethane		Tetrachloroethene	x
Heptachlorodibenzo-*p*-dioxins		Toluene	x
Heptachlorodibenzofurans		1,2,3-Trichlorobenzene	
Hexachlorodibenzo-*p*-dioxins		1,2,4-Trichlorobenzene	
Octachlorodibenzo-*p*-dioxin		1,1,1-Trichloroethane	
Pentachlorodibenzofurans		Trichloroethene	x
Tetrachlorodibenzo-*p*-dioxins		Dichlorodifluoromethane (FC12)	x
Tetrachlorodibenzofurans		Trichlorofluoromethane (FC11)	x
Di-*n*-butyl phthalate		2,4,5-Trichlorophenol	
Di-*n*-octylphthalate		1,2,3-Trichloropropane	
Dibenz(a,h)anthracene		1,2,4-Trimethylbenzene	x
Dibenzofuran		1,3,5-Trimethylbenzene	
1,2-Dibromo-3-chloropropane		Xylenes	x
1,2-Dichlorobenzene	x	Vinyl chloride	x

Source: JEG, 1997a

2.6.1.2 Exposure Assessment

Exposure assessment is the determination of the magnitude, frequency, duration, and route of exposure. Populations that currently or potentially may contact chemicals at Castle Airport were identified along with potential routes of exposure (contact with a chemical). Magnitude is determined by estimating the amount, or concentration, of the chemical at the point of contact over a specified time period, or exposure duration, as well as intake, or dose, of the chemical.

Releases of contaminants at CAFB were primarily from routine aircraft operation and maintenance activities, aviation support operations, vehicle and facility maintenance activities, accidental spills and releases, and on-site disposal of hazardous materials. Potential receptors include hypothetical on-base residents, visitors, and on-site workers. Since potential future on-site residents would have the highest frequency of exposure, the residential land use scenario is representative of a reasonable maximum exposure.

For an exposure pathway to be complete, a source, a mechanism of contaminant release, a transport medium, a potential receptor, and an exposure route must be present. Potential exposure to the soils was considered within a conservative depth range of 0 to 15 feet below ground surface (bgs). The exposure pathways that were considered in the *SCOU HHRA* were incidental soil ingestion, inhalation of particulates, inhalation of volatiles, dermal contact with contaminants in soil, and ingestion of homegrown produce.

The exposure point concentration is defined as the average concentration contacted at the exposure point(s) over the duration of the exposure period. Use of the arithmetic average coincides with U.S. EPA toxicity criteria, which are based upon lifetime average exposures. Use of the average also more accurately accounts for uneven spatial distribution of contaminant concentrations. Since the true mean is generally uncertain, the 95 percent upper confidence limit (UCL^{95}) of the arithmetic mean was used. The UCL^{95} was calculated for each analyte and compared to the maximum reported result. The lower of these two values was then selected as the exposure point concentration.

The exposure point concentration in homegrown produce was calculated using simple partitioning models that estimate the contaminant concentration in edible plant tissues resulting from the use of contaminated soil to grow food crops. Soil-to-plant concentration ratios were used to define the contaminant concentration in edible plant parts relative to the contaminant concentration in soil.

The amount of each chemical incorporated into the body is defined as the average daily dose (ADD). The ADD was calculated differently when evaluating carcinogenic effects versus noncarcinogenic effects.

- Noncarcinogens: The ADD was averaged over the estimated exposure period, which assumes that toxic injury does not occur after exposure ceases. Thus, the ADD represents the potential for adverse health effects over the period of exposure.
- Carcinogens: The ADD was based on the estimated exposure duration, extrapolated over an estimated 70-year lifetime. This is consistent with cancer slope factors, which are based upon lifetime exposures, and assumes that the risk of carcinogenic effects is cumulative and continues even after exposure ceases. Thus, the ADD for carcinogens is referred to as the lifetime average daily dose (LADD), and was averaged over 70 years regardless of actual exposure duration.

2.6.1.3 Toxicity Assessment

A toxicity assessment was conducted to estimate the probability and severity of adverse effects as a result of exposure to the COPCs. The toxicity assessment was composed of two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining whether exposure to a chemical may result in deleterious health effects in humans. Dose-response assessment characterizes the relationship between the dose and the incidence and/or severity of the adverse effect in the exposed population.

For risk assessment purposes, the COPCs are categorized as carcinogenic or noncarcinogenic. Since carcinogens may also yield adverse noncarcinogenic effects, they must also be evaluated as noncarcinogens. In evaluating the probability of carcinogenic risk, COPCs are assigned weight-of-evidence classifications that express the likelihood that the chemical is a human carcinogen. These classifications are based on the extent to which the chemical has been shown to be a carcinogen in experimental animals or humans, or both. The classifications are as follows:

A - Human carcinogen; sufficient evidence of carcinogenicity in humans

B1- Probable human carcinogen; limited evidence of carcinogenicity in humans

B2 - Probable human carcinogen; sufficient evidence of carcinogenicity in animals with inadequate or lack of human data

C - Possible human carcinogen; limited evidence of carcinogenicity in animals with inadequate or lack of human data

D - Not classifiable as to human carcinogenicity

E - Evidence of noncarcinogenicity for humans; no evidence of carcinogenicity in adequate studies.

Mathematical models are used to extrapolate from carcinogenic responses observed at high doses to responses expected at low doses. A toxicity value known as the slope factor (SF) was developed to quantitatively express the dose-response relationship. The SFs were calculated from the UCL^{95} of the dose-response curve, and expressed in units of milligrams per kilogram-day (mg/kg-day). The SFs are route-specific and are upper-bound estimates of the probability of a carcinogenic response per unit intake of a chemical over a lifetime.

Reference doses (RfDs) are the toxicity values used to evaluate noncarcinogenic effects of the COPCs, expressed as mg/kg-day. Reference doses are developed for both subchronic and chronic exposures, and are route-specific (ingestion or inhalation). The RfDs are preferably derived from dose-response data obtained from human studies; however, if such data are lacking, they are derived from animal studies based on pharmacokinetic and metabolic similarities. The smallest administered dose at which a toxic effect is seen (known as the lowest-observed-adverse-effect level (LOAEL)) is used to identify the study to be used for the development of RfD. Once the study with lowest LOAEL has been identified, the dose representing the highest level tested at which no adverse effect was demonstrated, the no-observed-adverse-effect level (NOAEL), is identified. The RfDs are based on a toxicologic threshold (a finite value that can be tolerated without producing a toxic effect for the range of exposures) and incorporate uncertainty factors (UFs). The UFs account for extrapolation of animal data to humans, sensitive individuals in the exposed population, the use of a NOAEL from subchronic rather than chronic studies, and the use of a LOAEL rather than a NOAEL to derive the RfD when a NOAEL has not been determined. Target organs and noncarcinogenic critical effects are listed on Table 2-3.

For certain chemicals, toxicity criteria may be lacking for certain routes of exposure, or have no federal or state-derived toxicity criteria. When route-specific SFs or RfDs are not available, toxicity values are extrapolated across exposure pathways, where appropriate, as determined by the U.S. EPA. RfDs and SFs are not available for the dermal route of exposure. Therefore, for evaluating the effects of dermal exposure to contaminants in soil, the oral toxicity values were adjusted from an administered dose to absorbed dose by accounting for adsorption efficiency of the chemical.

Table 2-3: Target Organs and Critical Effects of COPCs

COPC	Target and Critical Effect
Inorganics	
Arsenic	human: hyperpigmentation, vascular complications
Antimony	rat: blood glucose
Barium	human, rat: increased blood pressure, fetotoxicity
Beryllium	rat: none observed
Cadmium	human: proteinuria
Chromium	rat: none observed
Cobalt	NA
Lead	human: child neurobehavioral development
Mercury	rat: kidney
Molybdenum	human: increased uric acid levels
Nickel	rat: decreased organ weights
Selenium	human: selenosis
Silver	human: skin
Thallium	rat: increased SGOT and LDH
Organics	
Acenaphthene	mouse: liver
Acenaphthylene	
Anthracene	mouse: no effect
Benzene	NA
Benzo(a)anthracene	
Benzo(a)pyrene	
Benzo(b)fluoranthene	
Benzo(g,h,i)perylene	
Benzo(k)fluoranthene	
Bis(2-ethylhexyl)phthalate	guinea pig: liver
2-Butanone	mouse, rat: fetal birth weight
Butylbenzylphthalate	rat: increased liver weight
n-Butylbenzene	
sec-Butylbenzene	
t-Butylbenzene	
Carbon tetrachloride	rat: liver
α-Chlordane	rat: liver
γ-Chlordane	rat: liver
4-Chloroaniline	rat: spleen
Chlorobenzene	dog: liver, kidney
Chloroform	dog: liver
4-Chlorotoluene	
Chrysene	
Isopropylbenzene	rat: CNS, nose, kidney
Isopropyltoluene	
DDD	
DDE	
DDT	rat: liver
1,2,3,4,6,7,8-Heptachlorodibenzofuran	rat, mouse: reproductive effects
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	rat, mouse: reproductive effects
Octachlorodibenzo-*p*-dioxin	rat, mouse: reproductive effects
Di-*n*-butyl phthalate	rat: increased mortality
Di-*n*-octylphthalate	rat: kidney, liver, SGOT activity

Table 2-3: Target Organs and Critical Effects of COPCs

COPC	Target and Critical Effect
Dibenz(a,h)anthracene	
Dibenzofuran	
1,2-Dibromo-3-chloropropane	rabbit: testes
Dibromochloromethane	rat: liver
1,2-Dichlorobenzene	rat: no effect
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	rat: liver
1,1-Dichloroethane	cat: kidney
1,2-Dichloroethane	
cis-1,2-Dichloroethene	rat: blood
Dieldrin	rat: liver
Diethyl phthalate	rat: growth and organ weights
2,4-Dimethylphenol	mouse: lethargy, prostration, ataxia
2,4-Dinitrotoluene	dog: nervous system
Endrin	dog: liver, convulsions
Ethylbenzene	rat: liver and kidney; fetotoxicity
Fluoranthene	mouse: kidney, liver
Fluorene	mouse: RBC
Heptachlor epoxide	dog: increased liver/body weight ratio
Hexachlorobutadiene	mouse: kidney
Indeno(1,2,3-cd)pyrene	
Methylene chloride	rat: liver
2-Methylnaphthalene	
2-Methylphenol	rat: nervous system
4-Methylphenol	rabbit: CNS, respiratory distress
Naphthalene	NA
PCB	monkey: eyes, meibomian glands, nails, immune system
Pentachlorophenol	rat: liver, kidney
Phenanthrene	
Phenol	rat: fetal body weight
n-Propylbenzene	
Pyrene	mouse: kidney
Styrene	human: CNS effects / dog: red blood cells, liver
Tetrachloroethene	mouse: liver
Toluene	rat: liver, kidney
1,2,3-Trichlorobenzene	
1,2,4-Trichlorobenzene	rat: adrenal gland
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	mouse: serum
Trichloroethene	rat: liver
Trichlorofluoromethane	rat, mouse: increased mortality
2,4,5-Trichlorophenol	rat: liver and kidney pathology
1,2,3-Trichloropropane	rat: liver, kidney, blood
1,2,4-Trimethylbenzene	
1,3,5-Trimethylbenzene	
Xylenes	rat: CNS, whole body

Notes:

COPC = contaminant of potential concern

NA = not available

To reduce the variability in toxicological values used in the risk assessment, a standardized hierarchy of data is used for Superfund sites. The primary source of information is the Integrated Risk Information System (IRIS) database (U.S. EPA, 1996). The IRIS consists of RfDs and cancer SFs regularly updated by the U.S. EPA. A secondary source of toxicity information is the U.S. EPA Health Effects Assessment Summary Table (HEAST) (U.S. EPA, 1994). Additionally, RfDs and SFs may also be obtained from the U.S. EPA Environmental Criteria and Assessment Office, and the DTSC Office of Environmental Health Hazard Assessment. For the purposes of the SCOU HHRA, SFs from each source were compared and the largest value (i.e., the one that would yield the most conservative result) was used.

2.6.1.4 Risk Characterization

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess cancer risk is calculated from the following equation:

Risk = LADD x SF

These risks are probabilities of an individual developing cancer that usually are expressed in scientific notation (e.g., 2×10^{-5}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as 1 in 3. U.S. EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}. Specific chemicals at a site that contributed equal to or greater than 1×10^{-6} cancer risk were identified as risk-based COCs that required evaluation in the *SCOU FS*.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ <1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all COCs that affect the same target organ (e.g., liver) or act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI <1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI >1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

Non-cancer HQ = ADD/RfD

ADD and RfD are expressed in the same units (mg/kg of body weight per day [mg/kg-day]) and represent the same exposure period (i.e., chronic, subchronic, or short term). Specific chemicals at a site that contributed a hazard index of equal to or greater than 1 were identified as risk-based COCs that required evaluation in the *SCOU FS*.

A summary of the risk characterization results for the SCOU ROD Part 2 sites is provided on Table 2-3 (JEG, 2001). The risk characterization results for the SCOU ROD Part 2 sites are based on exposure via ingestion, inhalation (volatile emissions or airborne dust particles), and dermal absorption. Results with the produce pathway are included in Table 2-4 for sites where cancer risk equals or exceeds 1×10^{-6} without the produce pathway. The U.S. EPA has determined that lead exposure can result in nuerotoxic and developmental effects, primarily in children. RfDs for lead are not established because most human health effects data are based on measured blood-lead concentrations rather than on an estimated external dose. Thus, risks associated with exposure to lead were evaluated using the DTSC blood-lead biokinetic model (DTSC, 2000). The model was used to calculate a blood-lead level in hypothetical child residents and compared with the target blood-lead level of 10 micrograms per deciliter (µg/dL). The results, with and without the produce pathway, are shown on Table 2-5. Blood-lead levels were quantified only for Discharge Area 5, the only SCOU ROD Part 2 site where lead was detected and determined to be anthropomorphic. Since the lead concentrations at Discharge Area 5 resulted in an estimated blood-lead level less than 10 µg/dL, lead was not considered a COC that required evaluation in the SCOU FS.

2.6.1.5 Uncertainty Analysis

Risk characterization includes sources of uncertainty inherent to the risk assessment process. The uncertainties are due to limitations in the available site data and methods used to quantify risk. Uncertainty may be compounded and the resulting risk estimates may be overestimated or underestimated

Table 2-4
HHRA Results for SCOU ROD Part 2 Sites

Site	Adult Residential			
	Surface Soil		Subsurface Soil	
	Cancer Risk	Non-Cancer Hazard	Cancer Risk	Non-Cancer Hazard
Building 51	2E-08	0.001	*	*
Building 52	3E-08	0.001	*	*
Building 53	3E-08	0.002	*	*
Building 54	3E-08	0.001	*	*
Building 1253	*	*	**1E-05** **(7E-05)**	0.0003 (0.004)
Building 1260 (SWMUs 4.17, 4.18, 4.29)	*	*	**1E-05** **(7E-05)**	0.05 **(1.0)**
Building 1266	4E-08	0.0003	*	*
Building 1314	5E-08	0.003	*	*
Building 1350	2E-08	0.0002	*	*
Building 1532	1E-07	0.01	*	*
Building 1709	*	*	*	*
Building 1762	2E-08	0.0004	*	*
Discharge Area 4	5E-08	0.003	*	*
Discharge Area 5 (SWMUs 4.3 and 4.21)	6E-07[a]	0.18	**1E-06** **(2E-05)**	0.02 (0.2)
ETC 5	*	*	*	*
Hangar F-4	2E-08	0.0001	*	*
SA B3	*	*	*	*
Sanitary Sewer 2	1E-07	0.003	*	*
Sanitary Sewer 4	2E-08	0.0003	*	*
Structure 55	3E-07	0.02	*	*
Structure T66	1E-07	0.002	*	*
Structure T67	3E-08	0.0002	*	*
Building 1541 (SWMU 4.23)	1E-08	0.05	*	*
SWMUs 4.4, 4.5, 4.15[b]	*	*	**2E-06** **(1E-05)**	0.01 (0.03)
SWMU 4.6	2E-08	0.00002	*	*
SWMU 4.7	*	*	*	*
SWMU 4.8	*	*	*	*
SWMU 4.14	9E-07	0.02	*	*
SWMU 4.16	*	*	*	*
SWMU 4.22	9E-09	0.00001	*	*
PCB-4			**(6E-05)**	*
PCB-5			**(3E-04)**	*
PCB-6			**(1E-05)**	*

Notes
Results presented in bold equal or exceed cancer risk of 1E-06 or non-cancer hazard of 1.
Results shown in parentheses include the produce pathway. Risk values for PCB-4, PCB-5, and PCB-6 were estimated by EPA using a screening risk assessment that included the produce pathway, and risk was not estimated without the produce pathway.
* not calculated. No HHRA results were calculated for B1709, SWMUs 4.7, 4.8, and 4.16 because HHRA screening indicated that the sites did not pose an adverse risk to human health. ETC-5 and SA B3 were not included in the HHRA because they were not considered source areas and soil samples were not collected during the SCOU RI.
a Value revised from source (JEG, 2001) to correct the Henry's constant used for methylene chloride.
b HHRA results for SWMUs 4.4, 4.5, and 4.15 represent risk calculated for the cumulative sites within the PFFA and are not specific to each site.

Sources: JEG, 2001; JEG, 1997a, JEG, 2002f, U.S. EPA, 1998a

Table 2-5
Estimated Blood-Lead Concentrations

	Exposure Point Concentration (mg/kg)		Child Residential Blood-Lead Concentration (µg/dL)			
	Surface	Subsurface	Surface with Plant Uptake	Surface without Plant Uptake	Subsurface with Plant Uptake	Subsurface without Plant Uptake
Discharge Area 5 (SWMUs 4.3 and 4.21)	106.0	8.8	5.7	4.0	2.0	2.0

Note
DA-5 was the only SCOU ROD Part 2 site where lead was detected and determined to be anthropomorphic.
mg/kg = milligram per kilogram
µg/dL = microgram per deciliter

Source: JEG, 2002

by several orders of magnitude. The uncertainties associated with the SCOU HHRA result from limitations in the available information and methods for identification of COPCs, exposure assessment, toxicity assessment, and risk characterization. Specific uncertainty relating to identification of COPCs includes the designation of all detected organic compounds as COPCs, although several could have been elimimated due to very low concentrations (i.e., below detection limit), suspect detections (i.e., contaminated blank samples), and infrequent detections. Limitations in sampling locations, depth, and frequency also result in uncertainty. The SCOU HHRA evaluated complete exposure pathways for human receptors via soil ingestion, inhalation of volatiles, ingestion of homegrown fruits or vegetables (produce pathway), and dermal contact. As reported in the *SCOU HHRA*, there is a high degree of uncertainty associated with the produce pathway. Many of the past, current, and planned land uses at Castle Airport include aviation support or industrial activity. Hence, the use of the residential scenario, with the produce pathway, likely overestimates risk associated with actual human exposures. In addition, the model used to estimate the uptake and incorporation of contaminants into plant tissues is simplified and incorporates conservative assumptions that are likely to overestimate the concentration of contaminants in plant tissues by several orders of magnitude. Therefore, due to the high degree of uncertainty, incorporation of the produce pathway likely overestimates risk to human health.

Toxicity values are typically derived from studies performed on laboratory animals; thus uncertainty results from potential differences between laboratory animals and humans in the target organs affected, dose-response relationship, and absorption and metabolism. Many uncertainties are introduced into risk characterization by summing the risk or hazard for several substances across multiple pathways at a given site. This ignores possible synergistic or antagonistic effects of multiple chemical exposures. Because of the large number of uncertainties in the risk assessment process, results may be overestimated or underestimated by several orders of magnitude. However, since assumptions used in risk assessment typically err on the conservative (i.e., health-protective), estimates of risk are usually overestimated.

2.6.2 ENVIRONMENTAL ASSESSMENT

Water quality site assessments were performed based on background water quality analyses and RWQCB guidance. The WQSA procedure for soils established leachable contaminant concentrations in soil that are protective of groundwater quality. The goal of the WQSAs was to ensure that each SCOU site with potential to adversely affect groundwater quality was given appropriate consideration in the RI/FS.

2.6.2.1 Site Background Levels

The first step of the WQSA procedure was to establish background levels for known and suspected contaminants. Contaminants evaluated included VOCs, SVOCs, and inorganics (metals). The organic contaminants at Castle Airport are anthropogenic, thus are not found naturally in soil or water. Therefore, the background concentrations for organics are assumed to be zero. However, because analytical methods generally cannot report a zero level, the method detection limit (MDL) was established as the background level for organic contaminants.

Determining background levels for inorganic contaminants involved collection and analyses of soil samples from uncontaminated locations at Castle Airport. The background samples were segregated into four soil groups based upon soil type and depth. Statistical analyses were conducted to determine distribution of each inorganic compound in each soil group. The threshold background value (TBV) was then calculated based on the maximum measured concentration within each soil group. Several metals (boron, cadmium, hexavalent chromium, mercury, molybdenum, thallium, and selenium) were not detected in the background samples; therefore, the MDL was selected as the TBV. The TBVs for Castle Airport are listed on Table 2-6. The same methodology was used to develop soluble TBVs based on the California waste extraction test (WET). The soluble TBVs are shown on Table 2-7. The TBVs were approved by the BCT in December 1993. Detailed derivation of the TBVs is presented in the *SCOU RI/FS*.

2.6.2.2 WQSA Contaminants of Potential Concern

The initial list of COPCs was compiled from information obtained through remedial investigations and is provided on Table 2-2. Vadose zone modeling was then used to determine contaminant soil concentrations that were considered protective of groundwater. If the detected concentration of a contaminant in the soil was greater than the protective levels, the contaminant was retained as a COC. Due to greater mobility, VOCs pose the greatest risk to groundwater quality at Castle Airport, while SVOCs and metals are considered less likely to impact groundwater.

2.6.2.3 WQSA Evaluation of VOCs

Sites with VOC contamination were assessed using a phased approach. Initially, WQSAs were conducted as specified in *Draft Water Quality Site Assessment for Soils and Ground Water* (RWQCB, 1992). The WQSAs established protective levels for VOCs in soils and were used for identification of

Table 2-6
Threshold Background Values

Analyte	Shallow (less than 30 ft bgs)		Deep (greater than 30 ft bgs)		Threshold Background Value Range	
	Silts	Sands	Silts	Sands	Minimum	Maximum
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
aluminum	16,200	9,520	18,000	7,750	7,750	18,000
antimony	6.7	4.8	11.5	3.5	3.5	11.5
arsenic	9.9	9.74	12.2	4.4	4.4	12.2
barium	319	109	240	107.65	107.65	319
beryllium	0.89	0.39	0.85	0.26	0.26	0.89
boron **	20.0	20.0	20.0	20.0	20.0	20.0
cadmium **	0.5	0.5	0.91	0.5	0.5	0.91
calcium	6,590	2,520	8,740	2,070	2,070	8,740
chromium, total	29.4	19.1	27.7	7.3	7.3	29.4
chromium VI and compounds **	0.05	0.05	0.05	0.05	0.05	0.05
cobalt	12.8	7.0	13.3	5.4	5.4	13.3
copper	53.62	17.1	27.8	8.3	8.3	53.62
iron	25,900	20,400	46,100	14,300	14,300	46,100
lead	7.4	6.7	6.4	3.2	3.2	7.4
magnesium	8,160	5,040	10,400	4,615	4,615	10,400
manganese	1,100	228	765	266	228	1,100
mercury **	0.10	0.10	0.10	0.10	0.10	0.10
molybdenum	0.59	2.0	0.71	2.0	0.59	2.0
nickel	29.6	22.5	24.8	4.5	4.5	29.6
potassium	3,430	2,890	3,460	3,080	2,890	3,460
selenium **	0.5	0.5	0.5	0.5	0.5	0.5
silica	2,630	1,620	948	2,327	948	2,630
silver	0.30	0.45	0.61	0.30	0.30	0.61
sodium	315	116	208	89.3	89.3	315
thallium **	40.0	40.0	40.0	40.0	40.0	40.0
vanadium	70.2	58.06	109	28.8	28.8	109
zinc	70.2	46.9	101	32.8	32.8	101
gross alpha	34 pCi/g	48 pCi/g	72 pCi/g	44 pCi/g	34 pCi/g	72 pCi/g
gross beta	43 pCi/g	52 pCi/g	74 pCi/g	53.2 pCi/g	43 pCi/g	74 pCi/g

Note: alpha & beta units are pico Curie per gram (pCi/g); all other units are milligrams per kilogram (mg/kg).
**ND=Not detected at method detection limit (MDL)
For each group:
If less than 50%ND, replaced ND with one-half MDL before calculating mean and standard deviation
If greater than 50%ND, used maximum
If nonparametric, used maximum
If mean plus two standard deviations greater than maximum, used maximum
The last column in each group contains the threshold background values for that group
The threshold background value range takes the minimum and maximum of the group TBVs
Source: JEG, 1997a

Table 2-7
Soluble Threshold Background Values

	Shallow Background (mg/L)		Deep Background (mg/L)		Threshold Background Value Range (mg/L)		Threshold Background Value Range (µg/L)	
Analyte	Silt	Sand	Silt	Sand	Minimum	Maximum	Minimum	Maximum
aluminum	2.2	0.99	0.68	1.7	0.68	2.2	680	2200
antimony	NA	NA	NA	NA	NA	NA	NA	NA
arsenic	ND	ND	ND	ND	ND	ND	ND	ND
barium	0.022	0.0073	0.0054	0.013	0.0054	0.022	5.400	22.0
beryllium	0.00050	0.00050	ND	0.00060	0.0005	0.0006	0.5000	0.6000
boron	NA	NA	NA	NA	NA	NA	NA	NA
cadmium	ND	ND	ND	ND	ND	ND	ND	ND
calcium	6.3	1.1	1.2	1.7	1.1	6.3	1100	6300
chromium, total	ND	0.0067	ND	0.0069	0.0067	0.0069	6.700	6.900
hexavalent chromium	ND	ND	ND	ND	ND	ND	ND	ND
cobalt	ND	ND	ND	ND	ND	ND	ND	ND
copper	ND	ND	ND	ND	ND	ND	ND	ND
iron	1.6	0.80	0.63	1.7	0.63	1.7	630	1700
lead	0.017	0.023	0.015	0.015	0.015	0.023	15	23
magnesium	2.1	0.20	0.28	0.38	0.20	2.1	200	2100
manganese	0.030	0.010	0.0082	0.092	0.0082	0.092	8.20	92.0
mercury	ND	ND	0.00063	0.00057	0.00057	0.00063	0.57000	0.63000
molybdenum	0.0047	ND	0.0049	0.0040	0.004	0.0049	4.00	4.900
nickel	0.0110	0.019	0.02	0.0200	0.011	0.02	11.00	20.0
potassium	0.65	0.96	0.42	0.56	0.42	0.96	420	960
selenium	ND	ND	ND	ND	ND	ND	ND	ND
silica	NA	NA	NA	NA	NA	NA	NA	NA
silver	ND	ND	ND	ND	ND	ND	ND	ND
sodium	13	6.2	8.0	5.0	5.0	13	5000	13000
thallium	ND	ND	ND	ND	ND	ND	ND	ND
vanadium	0.043	0.028	0.024	0.022	0.022	0.043	22.0	43.0
zinc	0.027	0.020	0.015	0.026	0.015	0.027	15.0	27.0

Values are based on the California waste extraction test (WET).
NA=Not available -- WET results are not available for antimony, boron, or silica.
ND=Not detected at Method Detection Limit

Source: JEG, 1997a

potential source areas. A more detailed analysis was performed to further define the potential site contaminants likely to adversely impact groundwater. This process compared soil and soil gas contaminant levels to protective threshold levels that were estimated based on the U.S. EPA recommended VLEACH computer modeling program (Ravi and Johnson, 1997). The model used the conservative assumption that each SCOU site was underlain by sand, which is very permeable and offers little resistance to the downward migration of contaminants. Two VLEACH assessments were conducted. The first, VLEACH1, considered contamination leaching to the water table and mixing with groundwater in a one-foot-thick mixing zone. VLEACH1 used the MDLs as protective levels that could not be exceeded in groundwater due to contaminated leachate from SCOU sites. A second, more conservative estimation of groundwater impact was also conducted for the VOC contaminants. The second estimation, VLEACH2, did not consider a mixing zone and used water quality limits as the protective levels that could not be exceeded due to contaminated leachate from SCOU sites. VLEACH2, in general, resulted in lower groundwater protective thresholds than did VLEACH1.

2.6.2.4 WQSA Evaluation of SVOCs and Metals

Groundwater protective threshold levels for selected SVOC compounds were developed using the VLEACH1 (mixing zone) and VLEACH2 scenarios. The WQSA evaluation of SVOCs relied on the VLEACH modeling for naphthalene. Naphthalene was the most common and mobile SVOC detected at Castle Airport, and its physicochemical properties suggest that it is the most likely indicator for comparison of mobility with other SVOCs.

The results of subsurface investigations at sites with surface metal contamination indicated that soluble metal transport at Castle Airport was not common. The WQSA screening procedure for metals followed California RWQCB *Designated Level Methodology* (DLM) (RWQCB, 1989). This process indicates whether metal-bearing leachate poses a threat to groundwater. The DLM procedure compares leachate concentrations with background concentrations in groundwater versus allowable threshold limits (e.g., maximum contaminant levels [MCLs]).

2.6.2.5 Ecological Risk Assessment

Ecological issues pertaining to the SCOU will be addressed in the CB ROD Part 2. The scoping phase of the ecological risk assessment (ERA) for Castle Airport has been completed for all SCOU sites (JEG, 1995). The scoping phase considered the presence and quality of habitat potentially affected by contaminants, and potential exposure pathways available at each site. If a potential threat was identified, an ERA was conducted in three phases: a screening ERA (Phase I), validation/verification (Phase II), and remedial assessment (Phase III).

The scoping phase concluded that none of the 41 SCOU ROD Part 2 sites (nor the 12 stain sites excluded from CERCLA) posed an adverse risk to ecological receptors and were recommended for no further ecological investigation (NFEI). The recommendation of NFEI at the SCOU ROD Part 2 sites was based primarily upon the lack of adequate ecological habitat. Results of the final ERA, and any actions identified for the protection of ecological receptors and sensitive habitat associated with any of the 233 SCOU sites, will be incorporated into the CB ROD Part 2.

2.7 CASTLE AIRPORT REMEDIAL ACTION OBJECTIVES

Castle Airport RAOs for the SCOU ROD Part 2 are based on the protection of human health and groundwater quality. The protection of ecological receptors and habitats will be addressed in the CB ROD Part 2, which, as discussed in Section 2.4, is the final basewide ROD for Castle Airport. RAOs for the protection of human health and groundwater quality were established separately and are applicable to all sites where the human health RAOs or the WQSA thresholds (VLEACH1) are exceeded. In all cases, the human health RAOs must be attained and, if they are lower, the groundwater protective RAOs must also be attained.

Human health risk assessment RAOs were calculated during the RI/FS using the methodology outlined in *Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual (Part B), (U.S. EPA, 1991)* and updated in 2001 (JEG, 2001). The RAOs are generally established at the lowest level of either the concentration that represents a cancer risk of 1×10^{-6}, or the concentration that represents a chemical-specific non-cancer hazard quotient of 1. The RAO for lead was established as the level that would not result in an estimated blood-lead level greater than 10 µg/dL. The calculated values are based on exposure via ingestion, inhalation (volatile emissions or airborne dust particles), and dermal absorption. As discussed in Section 2.6.1.5, the incorporation of the produce pathway most likely results in a significant overestimation of risk to human health and therefore, was not incorporated into the derivation of HHRA RAOs. Where the calculated soil concentration exceeded the soil saturation limit for the analyte, the soil saturation value was used as the RAO.

Summaries of HHRA RAOs for VOCs, SVOCs, and metals are presented on Tables 2-8, 2-9, and 2-10, respectively. The HHRA RAOs are for the residential scenario and represent contaminant concentrations that do not pose an adverse risk to human health based upon the results of the HHRA.

The groundwater protective RAOs for SVOCs and metals were established based on the VLEACH1 and DLM methodologies, respectively, presented in Section 2.6.2.4, WQSA Evaluation of SVOCs and metals. The groundwater protective RAO for VOCs that exceed the WQSA threshold (VLEACH1) is the lowest level technically and economically achievable to protect human health and the environment, including groundwater quality, as determined by the SVE Termination or Optimization Process (STOP) discussed further below. As discussed in Section 2.6.2, the WQSA thresholds were established in the *SCOU RI/FS* and are intended to represent contaminant concentrations in the soil and soil gas that do not pose an adverse impact to groundwater quality. However, the thresholds apply as groundwater protective RAOs only for SVOCs and metals. WQSA thresholds for VOCs, SVOCs, and metals are provided on Tables 2-8, 2-9, and 2-10, respectively. Attainment of the groundwater protective RAO for VOCs is discussed further below.

When VOC concentrations are less than VLEACH2 thresholds, then remedial action for VOCs on the basis of groundwater protection is not required. When VOC concentrations at a site exceed the VLEACH1 thresholds then SVE, as the presumptive remedy for VOCs in soil, is included in the site remedy. When VOC concentrations fall between the VLEACH1 and VLEACH2 thresholds, a site-specific analysis is conducted to determine if SVE is appropriately included in the site remedy. The analysis includes detailed decision criteria agreed upon by the Air Force, U.S. EPA, DTSC, and RWQCB to initiate or terminate SVE activities on a site-specific basis. The initiation criteria are referred to as the SVE Turn-on and Remediation Test (START) evaluation, and the termination criteria are referred to as the STOP evaluation. The START and STOP evaluations integrate scientific, economic, and engineering judgment to answer the following decision criteria:

I. Will the contaminant mass in the vadose zone reach the groundwater?

II. Will the contaminant mass in the vadose zone cause the contaminant concentrations in the leachate to exceed the aquifer cleanup level?

III. Is it appropriate to install and operate (START), or terminate (STOP), an SVE system at this site?

If the answer to criterion I or II is no, then SVE is either not required, or can be terminated, and site closure proceedings can be initiated. Detailed START and STOP criteria are provided in Appendix D.

VLEACH2 values were not established as the groundwater protective RAOs due to the technical and economic uncertainty of attaining them. Attainment of the groundwater protective RAO for VOCs when VLEACH2 values cannot be attained by SVE is determined the STOP evaluation.

The START and STOP evaluations are initiated at a site where SVE is part of the remedy when, among other criteria, VOC concentrations at the site do not, or no longer, exceed the human health RAOs for VOCs, (i.e., the site does not pose an unacceptable risk to human health from VOC contaminants).

Table 2-8
HHRA RAOs and WQSA Thresholds for VOCs in Soil and Soil Gas

Contaminant	Model	WQSA Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas])						HHRA RAOs (Residential Scenario)
		Shallow		Deep				
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	< 15 feet (µg/kg)
Volatile Organics[1]								
benzene (soil)	VLEACH1	88,567.0	19,594.0	5,658.0	1,698.9	501.1	86.2	360
	VLEACH2	291.5	68.4	20.8	3.0	1.4	0.0	
benzene (soil gas)	VLEACH1	85,783.0	18,974.0	5,479.0	1,645.2	485.2	83.5	
	VLEACH2	282.2	66.3	20.1	5.9	1.4	0.1	
carbon tetrachloride (soil)	VLEACH1	2,700.0	1,000.0	500.0	300.0	200.0	100.0	240
	VLEACH2	47.8	18.3	10.2	6.6	4.6	1.7	
carbon tetrachloride (soil gas)	VLEACH1	2,848.8	1,040.1	555.1	352.7	235.0	102.4	
	VLEACH2	49.8	19.0	10.8	6.9	4.8	1.8	
chloroform (soil)	VLEACH1	8,900.0	2,000.0	5,700.0	1,700.0	500.0	100.0	450
	VLEACH2	291.5	68.4	20.8	3.0	1.4	0.0	
chloroform (soil gas)	VLEACH1	85,783.0	18,974.0	5,479.0	1,645.2	485.2	83.5	
	VLEACH2	282.2	66.3	20.1	5.9	1.4	0.1	
dichlorobenzene, 1,2-(soil)	VLEACH1	293,400.0	102,200.0	28,500.0	8,600.0	2,500.0	500.0	370,000
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2	
dichlorobenzene, 1,2-(soil gas)	VLEACH1	56,439.0	19,962.0	5,479.3	1,646.1	490.2	93.5	
	VLEACH2	56,439.0	37,525.0	10,512.0	2,962.3	547.8	4.8	
dichlorobenzene,1,4-(soil)	VLEACH1	293,400.0	102,200.0	28,500.0	8,600.0	2,500.0	500.0	3,600
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2	
dichlorobenzene,1,4-(soil gas)	VLEACH1	56,439.0	19,962.0	5,479.3	1,646.1	490.2	93.5	
	VLEACH2	56,439.0	37,525.0	10,512.0	2,962.3	547.8	4.8	
dichlorodiflouoromethane (FC12)- (soil)	VLEACH1	85.0	25.0	12.0	6.0	3.0	1.0	280,000
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1	
dichlorodiflouoromethane (FC12)- (soil gas)	VLEACH1	21,035.0	8,187.5	2,850.5	1,548.9	845.8	312.7	
	VLEACH2	2,001.3	620.8	286.5	156.8	85.4	14.2	

Table 2-8
HHRA RAOs and WQSA Thresholds for VOCs in Soil and Soil Gas

Contaminant	Model	WQSA Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas])						HHRA RAOs (Residential Scenario)
		Shallow		Deep				
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	< 15 feet (µg/kg)
dichloroethane,1,2- (soil)	VLEACH1	84.9	25.0	11.5	6.3	3.4	1.3	430
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1	
dichloroethane,1,2- (soil gas)	VLEACH1	21,036.0	8,187.5	2,850.5	1,548.9	845.8	312.7	
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2	
dichloroethene, cis-,1,2- (soil)	VLEACH1	1,212.7	454.7	249.5	160.7	110.0	50.8	140,000
	VLEACH2	21.5	8.4	4.8	3.2	2.3	1.0	
dichloroethene, cis-,1,2- (soil gas)	VLEACH1	2,294.0	860.1	472.0	304.0	208.1	96.0	
	VLEACH2	40.7	16.0	9.1	6.1	4.4	1.8	
dichloropropane,1,2- (soil)	VLEACH1	-------	-------	-------	-------	-------	-------	670
	VLEACH2	-------	-------	-------	-------	-------	-------	
dichloropropane,1,2- (soil gas)	VLEACH1	-------	-------	-------	-------	-------	-------	
	VLEACH2	-------	-------	-------	-------	-------	-------	
ethylbenzene (soil)	VLEACH1	220,400.0	88,804.0	24,747.0	7,435.9	2,226.0	442.4	230,000
	VLEACH2	220,340.0	220,340.0	78,540.0	22,619.0	4,383.4	42.1	
ethylbenzene (soil gas)	VLEACH1	48,799.0	18,662.0	5,479.3	1,646.3	492.1	97.9	
	VLEACH2	48,785.0	48,785.0	17,391.0	5,008.2	970.6	9.3	
methylene chloride (soil)	VLEACH1	84.9	25.0	11.5	6.3	3.4	1.3	2,300
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1	
methylene chloride (soil gas)	VLEACH1	21,036.0	8,187.5	2,850.5	1,548.9	845.8	312.7	
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2	
naphthalene (soil)	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	190,000
	VLEACH2	82,896.0	82,896.0	82,896.0	82,896.0	68,348.0	74.9	
naphthalene (soil gas)	VLEACH1	1,599.9	1,599.9	1,599.9	1,599.9	424.0	33.0	
	VLEACH2	1,599.9	1,599.9	1,599.9	1,599.9	1,318.9	1.4	
tetrachloroethene (soil)	VLEACH1	2,700.0	1,000.0	500.0	300.0	200.0	100.0	3,800
	VLEACH2	47.8	18.3	10.2	6.6	4.6	1.7	

Table 2-8
HHRA RAOs and WQSA Thresholds for VOCs in Soil and Soil Gas

Contaminant	Model	WQSA Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas])						HHRA RAOs (Residential Scenario)
		Shallow		Deep				
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	< 15 feet (µg/kg)
tetrachloroethene (soil gas)	VLEACH1	2,846.8	1,040.1	559.1	352.7	235.0	102.4	
	VLEACH2	49.6	19.0	10.8	6.9	4.8	1.8	
toluene (soil)	VLEACH1	215,810.0	44,728.0	12,463.0	3,744.0	1,128.0	207.6	520,000
	VLEACH2	315,150.0	75,409.0	21,600.0	6,148.9	1,201.8	25.7	
toluene (soil gas)	VLEACH1	94,872.0	19,682.0	5,479.0	1,645.9	489.2	91.3	
	VLEACH2	138,540.0	33,150.0	9,498.3	2,703.0	528.3	11.3	
TVPH-volatile (as gasoline in soil)	DLM	100,000.0	100,000.0	TBD[2]	TBD[2]	TBD[2]	TBD[2]	N/A
	DLM	-------	-------	-------	-------	-------	-------	
TEPH-extractable (as diesel; JP-4 in soil)	DLM	1,500,000.0	1,500,000.0	TBD[2]	TBD[2]	TBD[2]	TBD[2]	N/A
	DLM	-------	-------	-------	-------	-------	-------	
trichloroethene (soil)	VLEACH1	2,742.8	1,002.1	538.7	339.8	226.5	98.7	3,700
	VLEACH2	47.8	18.3	10.2	6.6	4.6	1.7	
trichloroethene (soil gas)	VLEACH1	2,846.8	1,040.1	559.1	352.7	235.0	102.4	
	VLEACH2	49.6	19.0	10.8	6.9	4.8	1.8	
trichlorofluoromethane (FC11)- (soil)	VLEACH1	85.0	25.0	12.0	6.0	3.0	1.0	1,200,000
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1	
trichlorofluoromethane (FC11)- (soil gas)	VLEACH1	21,035.0	6,187.5	2,850.5	1,548.9	845.8	312.7	
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2	
trimethylbenzene,1,2,4- (soil)	VLEACH1	293,350.0	102,200.0	28,480.0	8,555.9	2,547.9	485.9	120,000
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2	
trimethylbenzene,1,2,4- (soil gas)	VLEACH1	56,439.0	18,962.0	5,479.3	1,646.1	490.2	93.5	
	VLEACH2	56,439.0	37,525.0	10,512.0	2,962.3	547.8	4.8	
vinyl chloride (soil)	VLEACH1	84.9	25.0	11.5	6.3	3.4	1.3	30
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1	
vinyl chloride (soil gas)	VLEACH1	21,035.0	6,187.5	2,850.5	1,548.9	845.8	312.7	
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2	

Table 2-8
HHRA RAOs and WQSA Thresholds for VOCs in Soil and Soil Gas

Contaminant	Model	WQSA Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas])						HHRA RAOs (Residential Scenario)
		Shallow		Deep				
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	< 15 feet (µg/kg)
xylene (soil)	VLEACH1	293,350.0	102,200.0	28,480.0	8,555.9	2,547.9	485.9	210,000
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2	
xylene (soil gas)	VLEACH1	56,439.0	19,962.0	5,479.3	1,646.1	490.2	93.5	
	VLEACH2	56,439.0	37,628.0	10,512.0	2,962.3	547.8	4.8	

Footnotes

1- WQSA thresholds represent levels considered protective of groundwater.

HHRA RAOs reresent levels considered protective of human health.

VOC sites will be closed in accordance with the Castle AFB STOP process.

2- TEPH/TVPH RAOs are based on 0 to 20 ft DLM

TBD=To be determined. Greater than 20 ft must meet State Acceptance Criteria

Notes

Shaded regions indicate soil gas RAOs

VLEACH1= Vadose Zone model with 1 ft mixing zone.

VLEACH2= Vadose model with no mixing zone.

DLM= California Water Board, Designated Level Methodology.

WQSA = Water quality screening assessment

HHRA = Human health risk assessment

RAO = Remedial action objective

Source: JEG, 2001

Table 2-9
HHRA RAOs and WQSA Thresholds
for SVOCs

Contaminant[1]	Model	Water Quality Site Assessment Threshold for Given Maximum Depths of Contamination ([µg/kg [soil])						Human Health Risk Assessment RAOs (Residential Scenario)
		Shallow		Deep				< 15 feet
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	(µg/kg)
Semivolatile Organics								
anthracene								100,000,000
benzo(a)anthracene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	890
benzo(a)pyrene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	89
benzo(b)fluoranthene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	890
benzo(k)fluoranthene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	890
bis(2-ethylhexyl) phthalate	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	87,000
chrysene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	8,900
di-*n*-butyl phthalate	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	52,000,000
dichlorodiphenyldichloroethane	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	5,900
dichlorodiphenyldichloroethene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	4,200
dichlorodiphenyltrichloroethane	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	4,200
dibenz(a,h)anthracene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	150
dinitrotoluene,2,4-	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	3,900
fluoranthene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	18,000,000
g-chlordane	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	1,100
HPCDD, 1,2,3,4,6,7,8-	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	N/A
heptachlor epoxide	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	160
heptachlorodibenzo-*p*-dioxins	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	N/A
heptachlorodibenzofurans	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	N/A
hexachlorodibenzo-*p*-dioxins	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	N/A
indeno(1,2,3-cd)pyrene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	890
4-methylphenol	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	2,600,000
naphthalene (soil)[2]	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	190,000
octachlorodibenzo-*p*-dioxin	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	10
polychlorinated biphenyls	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	210
pentachlorodibenzofurans	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	1,200
phenanthrene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	14,000,000
pyrene	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	14,000,000
tetrachlorodibenzo-*p*-dioxins	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	0
tetrachlorodibenzofurans	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	N/A

Notes

[1] WQSA thresholds for SVOCs are based upon modeling results for napthalene, not the individual compounds listed. Napthalene was selected to conservatively represent the SVOCs.

[2] Napthalene is also included in the volatile organic compound RAO summary.

RAO = remedial action objective

Source: JEG, 2001

Table 2-10
HHRA RAOs and WQSA Thresholds for Metals and Other Inorganics

Contaminant	Water Quality Site Assesment Threshold for Metals[3] (µg/kg)	HHRA RAOs (Residential Scenario) (µg/kg)
aluminum	71,103,000	100,000,000
antimony	11,500	280,000
arsenic[4]	20,000	1,000
barium	2,775,000	44,000,000
beryllium	7,600	910,000
cadmium	43,700	4,400
chromium[3]	2,500,000	100,000,000
cobalt	349,000	42,000,000
copper	244,000	26,000,000
lead	855,000	400,000
manganese	228,000	12,000,000
molybdenum	95,000	3,500,000
mercury	100	210,000
nickel[1]	1,167,000	8,400,000
selenium	32,000	3,500,000
silver	N/A	3,500,000
thallium[2]	20,000	47,000
vanadium	629,000	4,900,000
zinc	319,000	100,000,000

Notes

[1]Nickel (soluble salts)

[2]Thallic oxide

[3]WQSA values derived using California Water Board Designated Level Methodology; depth interval assumed to be 40 to 65 ft bgs.

[4]The arsenic RAO is less than the TBV so the TBV serves as the RAO.

N/A = not applicable

Contaminant	SCOU Shallow Silts Threshold Background Value (µg/kg)
aluminum	16,200,000
antimony	6,700
arsenic	9,900
barium	319,000
beryllium	890
cadmium	500
chromium[3]	29,400
cobalt	12,800
copper	53,600
lead	7,400
manganese	1,100,000
molybdenum	590
mercury	100
nickel[1]	29,600
selenium	500
silver	300
thallium[2]	40,000
vanadium	70,200
zinc	70,200

Source: JEG,2001

Notes

[1]Nickel (soluble salts)

[2]Thallic oxide

[3] Values derived using DLM for depth 45 to 65 feet bgs.

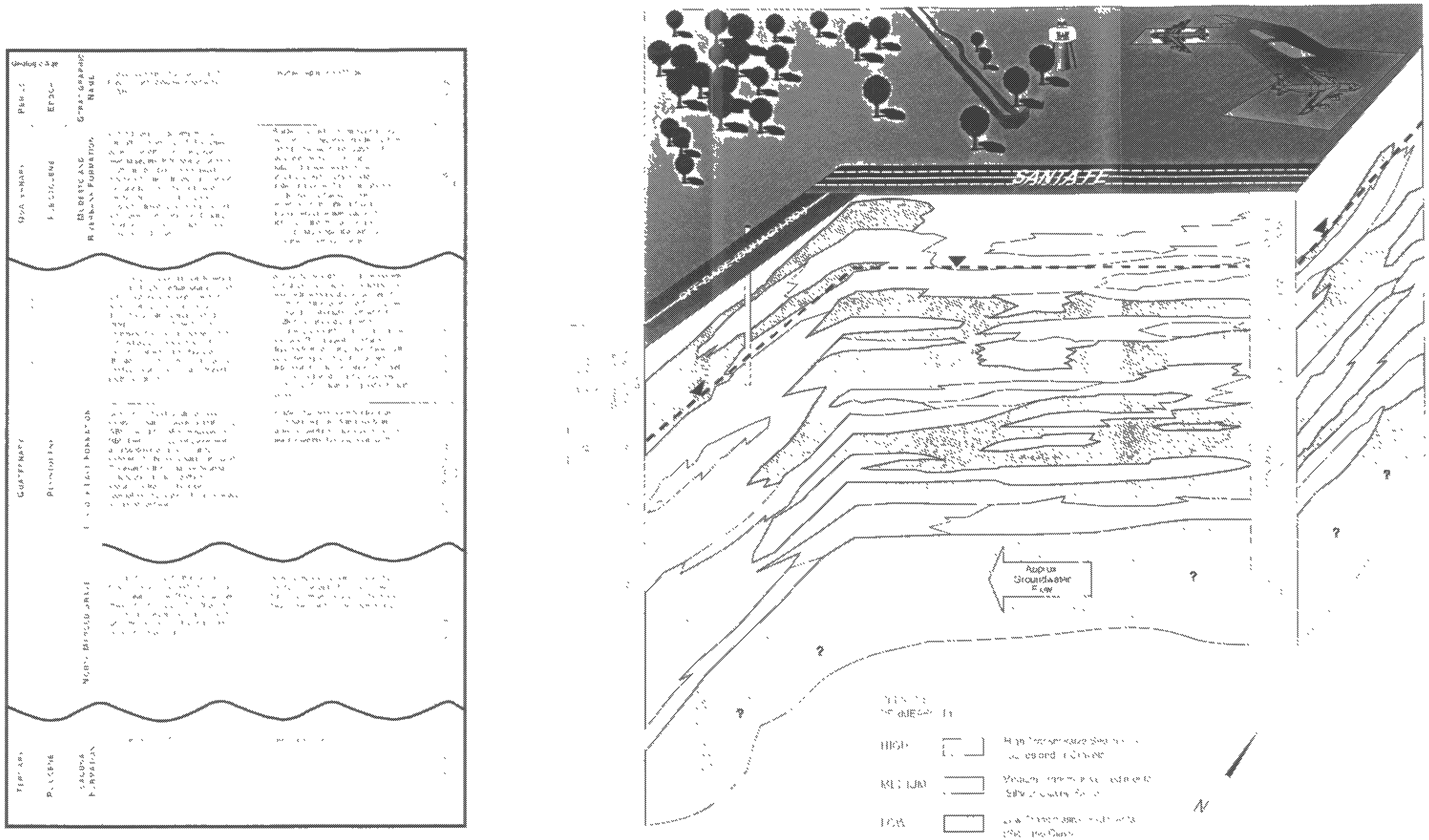
2.8 SITE CHARACTERISTICS

This section provides the generalized basewide conceptual model for Castle Airport, and specific information pertaining to the SCOU ROD Part 2 sites. The site-specific subsections include background information, site characterization data, HHRA results, human health risk management, if applicable, environmental assessment results, site COCs and the selected remedy. Data are taken primarily from the *SCOU RI/FS* (JEG, 1997a), although updated information from the *Data Gap Investigation Report* (JEG, 1999) and *SVE Decision Study Data Report* (Earth Tech, 2000a) are also included. Results of the Data Gap Investigation and SVE Decision Study are specifically referenced; all other information is taken from the *SCOU RI/FS*.

Castle Airport is located within the Merced River Valley, which is part of the larger San Joaquin Valley. The area has been leveled by progressive down cutting of the Merced River and its tributaries, and by wind erosion. The airport is situated about halfway between the Merced River and Black Rascal Creek, two tributaries of the San Joaquin River. This river and creek make up the major surface drainages near Castle Airport. Except for periods of prolonged or heavy rain, runoff does not discharge from Castle Airport. During periods of heavy rainfall, runoff is diverted to the southern tip of the base where it accumulates behind a weir that discharges to either Livingston Canal or Canal Creek. Water remaining behind the weir dissipates by evaporation and percolation.

The San Joaquin Valley forms the southern half of the Great Valley Geomorphic Province of California and is underlain by a basement complex composed of metamorphic and granitic rocks. In the vicinity of Castle Airport, the basement is overlain by a sequence of sedimentary deposits in excess of 350 feet deep. A generalized conceptual model of the subsurface at Castle Airport is presented on Figure 2-3.

Sands dominate the unsaturated soils (vadose zone) beneath Castle Airport and range from poorly graded to well graded with a significant component of silty sands. Clayey sands are encountered to a lesser degree and well-graded sands only occasionally. Silt and clay are also encountered. In general, soil types found in the vadose zone are as follows:



GENERALIZED BASEWIDE CONCEPTUAL MODEL

FIGURE 2-3

Modified from Jacobs Engineering, 1992

- Upper vadose zone (less than 25 feet bgs) comprised of silty sand and to a lesser degree poorly graded sand
- Middle vadose zone (25 feet to 50 feet bgs) contains poorly graded sand with a lesser degree of silty sand, and minor amounts of clayey sand and well graded sand
- Lower vadose zone (50 feet to 70 feet bgs) comprised of poorly graded sand and silty sand, with occasional gravels near 70 feet bgs.

Due to the heterogeneous nature of the soils, vertical migration rates of contaminant releases can vary widely. Iron- and silica-cemented sands and silts (hardpan) are often encountered between approximately 2.5 feet and 15 feet bgs. This hardpan is discontinuous beneath the base and varies in thickness from a few inches to greater than 5 feet. Because the degree of cementing varies widely, the hardpan is not completely impermeable. However, the hardpan can retard vertical movement of moisture and form local perched water zones. The hardpan has not served as a significant barrier to vertical migration of contaminants.

The general horizontal groundwater flow direction beneath Castle Airport is west-southwest toward the San Joaquin River. This is consistent with the regional groundwater flow in the eastern part of the San Joaquin Valley. Two regional pumping centers northwest and south-southwest of Castle Airport influence local groundwater flow directions in the Atwater-Merced area. The migration and fate of dissolved contaminants in groundwater at Castle Airport depend largely on the influence of these pumping centers as well as natural hydrogeologic conditions.

Groundwater zones beneath Castle Airport are heterogeneous and are characterized by laterally discontinuous lenses of channel-fill sands and gravels surrounded by less permeable overbank deposits. These groundwater zones are divided into five HSZs: the shallow HSZ, upper subshallow (USS) HSZ, lower subshallow (LSS) HSZ, CF HSZ, and deep HSZ (Figure 2-3). Each HSZ is a sequence of sediments with the finer sediments generally occurring at the top and the predominant water-bearing sections or lenses at the bottom. The HSZs do not represent isolated aquifers, but provide the general stratigraphic correlation to guide the installation of monitoring wells within predominant water-bearing units.

There is a small, natural, vertical component of groundwater flow beneath Castle Airport (JEG, 1996a). Hydrographs indicate a relatively consistent downward vertical gradient between the shallow and USS HSZs and that these two HSZs are in relatively close hydraulic connection. Cyclic, seasonal fluctuations are observed in the CF HSZ due to pumping of groundwater for irrigation purposes during the late summer and fall. The dissimilarity in water level fluctuations between the shallow HSZ and CF HSZ suggests there is little direct hydraulic connection between these zones.

2.8.1 VOC SITE SUMMARIES

The 21 VOC sites included in SCOU ROD Part 2 are listed below. Site summaries representing pertinent information from the *SCOU RI/FS* are provided for each site in the following sections. Site associations and groupings used in the *SCOU RI/FS* are also used in the site summaries. In general, concentrations of TCE, PCE, cis-1,2-dichloroethene (DCE), benzene, total volatile petroleum hydrocarbons (TVPH), and total extractable petroleum hydrocarbons (TEPH) in soil and soil gas at the VOC sites constitute a principal threat to groundwater. Consistent with the derivation of HHRA RAOs, the HHRA results provided for each site are for the residential scenario without the homegrown produce pathway.

Where SVE systems are currently operating or will be operating in the future, the Air Force will either retain ownership of the property until the systems have ceased to operate and a final closure report has been approved by the agencies, or will adopt suitable institutional controls that protect building residents and the operating systems until closure is achieved.

Volatile Organic Compound Sites (21 Sites)			
Building 51[1]	Building 1266[2]	Discharge Area 5	Structure 55[2]
Building 52[1]	Building 1314[3]	ETC5[2]	Structure T66[2]
Building 53[1]	Building 1350	Hangar F-4	Structure T67[2]
Building 54[2]	Building 1709	SA B3[2]	
Building 1253[1]	Building 1762	Sanitary Sewer 2	
Building 1260[2]	Discharge Area 4[3]	Sanitary Sewer 4	

[1] indicates facilities in the Building 51 Group
[2] indicates facilities in the Building 54 Group
[3] indicates that Discharge Area 4 is associated with Building 1314

2.8.1.1 Building 51 Group

Site Description

The Building 51 (B51) Group is located in grid R,11 (Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-1). It is composed of four buildings: B51, B52, B53 and B1253. Three SWMUs are associated with B1253 (4.26, 4.27 and 4.30). Both the JP-4 fuel line and the sanitary sewer line run through this site. The past and current uses of the B51 Group facilities are summarized as follows:

- B51 is currently used as a restoration hangar for the Castle Airport Museum. It was previously used for aircraft maintenance.

- B52, now demolished, was the location of an engine cleaning and electroplating shop. Later it was designated as an Aircraft General Purpose Shop. B317, formerly used as the Bachelor Officer's Quarters, was constructed at the former site of B52.

- B53, now demolished, was the location of an engine cleaning shop. Later, it was designated as an Aircraft General Purpose Shop.

- B1253 was part of the 93rd Field Maintenance Squadron Shops. It once housed corrosion control and metals processing facilities, which no longer operate. A 12,000-gallon underground storage tank (UST) used to store heating oil was located east of B1253. The UST was removed in June 1996 (Laguna, 1997) in accordance with California Code of Regulations (CCR) Title 23 requirements and with the approval of the RWQCB.

- SWMU 4.26, located on the east side of B1253, was a solvent distillation unit. Methyl ethyl ketone (MEK) was recycled for the corrosion control/paint hangar. Sludge generated at this unit was drummed and shipped to an off-site hazardous waste disposal facility. The unit was removed in 1993 in accordance with RCRA requirements. SWMU 4.26 was included in SCOU ROD Part 1 as a NFA site.

- SWMU 4.27 at B1253 was a spray booth sump that held water contaminated with paint overspray and VOCs. Paint sludge from this facility was disposed in CAFB landfills until 1980, when off-site disposal began. MEK and paint stripper were sent to fire training areas or placed in disposal pits until 1975, when it was either discharged into the sanitary sewer line or disposed off-site. The unit was removed in 1989 in accordance with RCRA requirements. SWMU 4.27 was included in SCOU ROD Part 1 as a NFA site.

- SWMU 4.30 at B1253 was used as a 90-day hazardous waste accumulation point and consists of a drum storage pad. The facility is no longer in use, but the concrete pad was left in place. SWMU 4.30 was included in SCOU ROD Part 1 as a NFA site.

The ground surface of the B51 Group is covered primarily with buildings, concrete and asphalt-paved streets and parking lots. The B51 Group is generally underlain by interbedded silty sand, sand and silt. A relatively continuous silty sand unit is found 5 feet bgs, ranging from 5 feet to 20 feet thick. A relatively continuous sand to silty sand layer is present from 20 feet to 40 feet bgs, typically underlain by a silt layer to approximately 50 feet bgs. Sand and gravel dominate the basal vadose zone stratigraphy beneath the silt layer.

No surface spills were identified at any of the buildings within the B51 Group. Potential contaminant sources at the B51 Group were the spray booth sump, UST, floor drains, hazardous waste storage pad, sanitary sewer laterals and portions of the JP4 fuel line. COPCs included solvents, paint strippers, metals, cyanide and waste oil associated with site operations.

Site Characterization

No documented investigations were performed at the B51 Group site before the SCOU RI. During the Phase 1 SCOU RI, soil borings were drilled near the potential release sources and soil and soil gas samples were collected for characterization of site contamination. During the Phase 2 RI, step-out borings were drilled and additional soil and soil gas samples were collected to fill data gaps for the extent of VOC contamination at the B51 Group site. Soil and soil gas sampling locations for the B51 Group site during the SCOU RI are provided in Appendix E (Figure E-1). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B51 Group SCOU RI Sampling Summary				
Site Location	**Soil Borings**	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
Building 51	11	8	31	22
Building 52	10	9	25	32
Building 53	4	4	11	10
Building 1253	7	4	17	20
Totals:	**32**	**25**	**84**	**84**

B51 Group SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Lead	SW7421
Cyanide	SW9012
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

B51 Group SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Sample Depth (feet bgs)**	**Units**
Soil Results				
VOCs	TCE	0.7	49-50	mg/kg
PAHs	Pyrene	2.5	5.5-6.5	mg/kg
	Benzo(a)pyrene	1.1	2.5	mg/kg
Petroleum Hydrocarbons	TEPH	16	5.5-6.5	mg/kg
Metals	Barium	139 (109)	5.5-6.5	mg/kg
	Beryllium	0.4 (0.39)	20.5-21.5	mg/kg
	Chromium	45.5 (29.4)	20.5-21.5	mg/kg
	Manganese	1280 (1100)	10.5-11.5	mg/kg
	Silver	0.5 (0.45)	20.5-21.5	mg/kg
Soil Gas Results				
VOCs	TCE	1,100	49-50	µg/L
	PCE	760	40-40.5	µg/L

Note
* The corresponding TBVs are listed in parentheses.

Chlorinated VOCs (TCE and PCE) were detected in soil and soil gas samples throughout the B51 Group site to a maximum depth of approximately 50 feet bgs. The estimated extent of the TCE plume in soil gas is shown in Appendix E (Figure E-1). Polynuclear aromatic hydrocarbons (PAHs) and petroleum hydrocarbons were detected in soil samples to a maximum depth of approximately 5.5 feet bgs. Metals greater than threshold background values were detected in soil samples to a maximum depth of approximately 20 feet bgs. The SCOU RI concluded that the metals detections are not likely anthropogenic because all were within the TBV range for sand/silt and there was no identified source for the specific metals exceeding TBVs. The metals were typically detected at depth but not in shallower soil samples and showed no pattern indicative of anthropogenic origin. In addition, there was evidence that some of the metals could be associated with observed coatings on mineral grains.

Based on the SCOU RI, the BCT agreed that the B51 Group was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of chlorinated VOC (TCE and PCE) contamination in soil gas. This additional characterization to support the remedial action was completed under the SVE Decision Study. The SVE Decision Study at the B51 Group included the installation of 16 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (48 total screens) were sampled and analyzed for TCE with a field gas chromatograph (GC). The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE and PCE (the primary contaminants) were detected at maximum concentrations of 2,305 micrograms per liter (μg/L) and 1,201 μg/L, respectively in the laboratory samples (Earth Tech, 2000b). The highest VOC concentrations were consistently detected in the deep screen of each vapor well. A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

B51 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
16	48	48	16

B51 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

B51 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,1-DCE	9.93	50-60	µg/L
	carbon tetrachloride	43.40	50-60	µg/L
	chloroform	2.44	50-60	µg/L
	cis-1,2-DCE	10.32	50-60	µg/L
	ethylbenzene	0.03	50-60	µg/L
	4-ethyl toluene	0.04	50-60	µg/L
	n-hexane	0.13	50-60	µg/L
	PCE	1,201	50-60	µg/L
	toluene	0.09	50-60	µg/L
	TCE	2,305	50-60	µg/L
	1,2,4-trimethylbenzene	0.05	50-60	µg/L
	xylenes (m,p)	0.11	50-60	µg/L
	xylene (o)	0.03	50-60	µg/L

A complete presentation of RI activities and results for the B51 Group site is provided in Section 7.2.3 of the *SCOU RI/FS* (JEG, 1997a). Results of the SVE Decision Study at the B51 Group are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

The HHRA quantified risk at B51, B52, B53, and B1253. The maximum cumulative residential risk for B51 was 2×10^{-8} and the non-cancer hazard index was 0.001. The maximum cumulative residential risk for B52 was 3×10^{-8} and the non-cancer hazard index was 0.001. The maximum cumulative residential risk for B53 was 3×10^{-8} and the non-cancer hazard index was 0.002. Based on these results, B51, B52 and B53 do not pose an adverse risk to human health.

The maximum cumulative residential risk for B1253 was 1×10^{-5} and the non-cancer hazard index was 0.0003. The COC contributing to the majority of risk at B1253 was benzo(a)pyrene (approximately 70 percent of the risk), which was detected in one soil sample at B1253. No other COPCs have an individual risk in excess of 1×10^{-6}. The concentration of benzo(a)pyrene (1.1 mg/kg) exceeded the HHRA RAO (0.089 mg/kg), and thus represents an adverse risk to human health.

Human Health Risk Management

During the SCOU RI, a total of 30 soil samples from 11 borings (B1253SB01 through B1253SB04, and SS4SB01 through SS4SB07) drilled near B1253 and along SS-4 were analyzed for SVOCs (JEG, 1996a). One sample collected at 5.5 feet bgs from boring B1253SB01 had PAH detections resulting in a maximum cumulative residential risk value of 1×10^{-5} and a hazard index of 0.0003. These risk and hazard values are within U.S. EPA's risk management range of 10^{-4} to 10^{-6} for carcinogenic risk and below the hazard index of 1.0 for noncarcinogens. Additional soil sampling at B1253 and within a previously unsampled stained area at B51 was conducted in 2002 and no contaminants were detected above human health RAOs or WQSA thresholds (MWH, 2002a). Thus, PAHs at B1253 are isolated to a single soil sample, indicating that the HHRA overestimated the adverse risk to human health at B1253. Additionally, the isolated detection may be the result of asphaltic material used in the backfill for the sanitary sewer, not the result of a PAH release.

Environmental Assessment

The maximum allowable concentrations of TCE (1,100 μg/L at 49 to 50 feet bgs and 2,305 μg/L at 50 to 60 feet bgs), PCE (760 μg/L at 49 to 50 feet bgs and 1,201 μg/L at 50 to 60 feet bgs), 1,1-DCE (9.93 μg/L), cis-1,2-DCE (10.32 μg/L), and carbon tetrachloride (43.4 μg/L) in soil gas exceeded WQSA thresholds (235 μg/L [VLEACH1] and 4.8 μg/L [VLEACH2] for TCE at 40 to 50 feet bgs; 102.4 μg/L [VLEACH1] and 1.8 μg/L [VLEACH2] for TCE at 50 to 60 feet bgs; 235 μg/L [VLEACH1] and 4.8 μg/L [VLEACH2] for PCE at 40 to 50 feet bgs; 102.4 μg/L [VLEACH1] and 1.8 μg/L [VLEACH2] for PCE at 50 to 60 feet bgs; 0.1 μg/L [VLEACH2] for 1,1-DCE at 50 to 60 feet bgs; 1.8 μg/L [VLEACH2] for cis-1,2-DCE at 50 to 60 feet bgs; 1.8 μg/L [VLEACH2] for carbon tetrachloride at 50 to 60 feet bgs). Accordingly, soil contamination at the B51 Group poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for the B51 Group are listed below.

COC (concentration)	RAO Source	RAO
TCE (1,100 µg/L, soil gas)	STOP	VLEACH2 - 4.8 µg/L, 40 to 50 feet bgs or lowest level technically and economically achievable
TCE (2,305 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
PCE (760 µg/L, soil gas)	STOP	VLEACH2 - 4.8 µg/L, 40 to 50 feet bgs or lowest level technically and economically achievable
PCE (1,201 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
1,1-DCE (9.93 µg/L, soil gas)	STOP	VLEACH2 - 0.1 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (10.32 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
carbon tetrachloride (43.4 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE, PCE, 1,1-DCE, cis-1,2-DCE, and carbon tetrachloride in soil gas represent an adverse risk to groundwater quality.

Selected Remedy

The FS evaluated remedial alternatives to address VOCs in soil gas exceeding WQSA thresholds. The selected remedial alternative for the B51 Group is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. Implementation of SVE will reduce concentrations of VOCs to levels that no longer pose an adverse risk to groundwater. Recent soil sampling has indicated that the presence of PAHs at B1253 is isolated and not representative of a release. Implementation of SVE at the B51 Group was initiated in August 2001 as a removal action. The *Action*

Memorandum (MWH, 2001a) and *Design Report* (MWH, 2001b) were reviewed and approved by the BCT.

2.8.1.2 Building 54 Group

<u>**Site Description**</u>

The Building 54 (B54) Group is located in grid R,12 (Plate 1, Appendix A). A site map is shown in Appendix E (Figure E-2). The B54 Group is composed of the following facilities/sites: Buildings 54, 1260 and 1266; Structures 55, T66 and T67; Earth Technology Corporation Site 5 (ETC-5); and SA-B3. There are three SWMUs (4.17, 4.18 and 4.29) associated with B1260 and one SWMU (4.6) associated with ETC-5. SWMUs 4.6, 4.17, 4.18, and 4.29 are addressed separately in Sections 2.8.2.3, 2.8.3.8, 2.8.3.9, and 2.8.3.10, respectively. The JP4 fuel line, sanitary sewer line and industrial waste line run through the site. The past and current uses of the B54 Group facilities are summarized as follows:

- B54 was constructed in 1942 as an engine maintenance shop, for the last 15 years it has been used as the 93rd Logistic Mobility Center for the transport of crew and equipment. There are four floor drains in B54 that may discharge into the sanitary sewer line. A 2,000-gallon UST was located at B54.

- ST-55 was built in 1943 and consists of a concrete pad with a rolled roof. The facility may have been used as a washrack. Two floor drains discharge into the storm drain or sanitary sewer line.

- ST-T66 was constructed in 1949 and was used as a washrack equipment building. Since 1957, ST-T66 has been used as an industrial waste treatment and disposal facility. Two sumps are located near ST-T66. A 300-gallon UST was reportedly also located near ST-T66, but has not been found.

- ST-T67 was built in 1951 and served as a degreasing facility until it was determined to be unusable in 1959. This facility may have been associated with the washrack at ST-T66.

- B1260 was used primarily for jet engine maintenance. Bearings and engine parts were cleaned in designated rooms, while assembly and maintenance was performed in the main shop area. Wastes from these activities were temporarily stored at the 90-day hazardous waste accumulation point (SWMU 4.29) prior to disposal at the CAFB fire training areas and disposal pits. A washrack located at B1260 discharged wastewater into two OWSs (SWMU 4.17 and 4.18). SWMUs 4.17 and 4.18 were contained in unlined concrete vaults with no leak detection system and discharged into the industrial waste line and sanitary sewer line.

- B1266, the former hazardous materials storage area located southeast of ST-T66, was assigned to the B54 Group for further investigation. The facility consists of two storage buildings, one for acids and another one for flammables. An open area between the structures was used to store 55-gallon drums and other waste containers and this area drains to a nearby ditch. A 12,000-gallon aboveground storage tank (AST) containing PD-680 located near B1266 was removed in 1991.

- SA B3 is a former storage area north of B1266 that was assigned to the B54 Group for further investigation. SA-B3 was identified during a review of aerial photographs. The materials stored at this area are unknown.
- ETC-5 is a former vehicle maintenance and parking area, located northwest of the Petroleum Fuel Farm Area (PFFA) that was assigned to the B54 Group for further investigation. ETC-5 was identified during a review of aerial photographs.

Both OWSs at B1260 (SWMUs 4.17 and 4.18) and the one at B88 (SWMU 4.6) were removed in May 1996 (Laguna, 1997) in accordance with CCR Title 23 requirements and RWQCB approval is pending. The drum storage pad at B1260 (SWMU 4.29) remains in place. The site summaries for SWMUs 4.6, 4.17, 4.18, and 4.29 are provided in Sections 2.8.2.3, 2.8.3.8, 2.8.3.9, and 2.8.3.10, respectively. The 2,000-gallon UST at B54 was removed in March 1996 in accordance with CCR Title 23 and the approval of the RWQCB.

The surface cover at the B54 Group site consists of concrete and a paved parking area. Surface soil is generally underlain by interbedded silty sand, silt and sand. A continuous silty sand layer, varying from 5 to 20 feet in thickness, starts at 5 feet bgs. Silt lenses in the top 5 to 10 feet bgs near ST-T66 are underlain by a silty sand layer to 20 feet bgs. A sand layer, 20 to 30 feet thick, is present under the silty sand.

The COPCs included solvents, fuels, acids and waste oils. Suspected contaminant sources at the B54 Group site were: JP4, sanitary sewer and industrial waste pipelines, floor drains, washracks, OWSs, USTs, ASTs and the hazardous waste storage pad.

<u>Site Characterization</u>

No documented investigations were conducted at the B54 Group before the SCOU RI, except at ETC-5. In a 1987 soil gas survey, TCE was detected in soil gas samples (maximum concentration of 18 parts per billion by volume [ppbv]) near B90 in ETC-5.

During the Phase 1 SCOU RI, soil borings were drilled near potential contamination release sources at the B54 Group site and soil and soil gas samples were collected for characterization of site contamination. Based on the results of previous investigations, SWMU 4.6 was considered the only potential source area at ETC-5. No other sampling was performed at ETC-5 during the SCOU RI. Analysis of samples collected at SWMU 4.6 did not indicate the presence of VOCs, SVOCs, or petroleum hydrocarbons. During the Phase 2 RI (except at SA-B3), step-out soil borings were drilled and additional soil and soil gas samples were collected to determine the extent of VOC and petroleum hydrocarbon contamination at the B54 Group site. Soil and soil gas sampling locations for the B54 Group site during the SCOU RI are provided in Appendix E (Figure E-2). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B54 Group SCOU RI Sampling Summary				
Site Location	**Soil Borings**	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
B54	9	17	29	28
B1260	15	15	39	40
ST-55	8	8	24	23
ST-T66	10	11	32	30
ST-T67	4	3	11	10
B1266	13	16	27	30
SA-B3	0	4	0	7
Totals:	**59**	**74**	**162**	**168**

B54 Group SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH; E418.1 (B1260 only)
Metals	SW6010 (B54 only)
Lead	SW7421
pH	SW9045 (B1266 only)
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

B54 Group SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	TCE	1.5	44-45	mg/kg
	Xylenes	16.4	20.5-21.5	mg/kg
	1,4-dichlorobenzene	11.5	10-10.5	mg/kg
Petroleum Hydrocarbons	TVPH	840	20.5-21.5	mg/kg
	TEPH	920	10-10.5	mg/kg
SVOCs	Naphthalene	0.23	10-10.5	mg/kg
	2-Methylnaphthalene	0.4	10-10.5	mg/kg
Soil Gas Results				
VOCs	cis-1,2-DCE	291	10-10.5	μg/L
	TCE	3,500	30-30.5	μg/L
	Benzene	184	20	μg/L
	Xylenes	122	20	μg/L
	Vinyl Chloride	81	10-10.5	μg/L

Chlorinated and aromatic VOCs were detected in soil and soil gas samples from the B54 Group site to respective depths of approximately 50 and 30 feet bgs. Petroleum hydrocarbons (gasoline and diesel) were detected in soil samples to a depth of approximately 40 feet bgs. Low concentrations of SVOCs were detected in soil samples to a depth of approximately 10 feet bgs. The estimated extent of VOCs in soil and soil gas is shown in Appendix E (Figure E-2).

1,4-dichlorobenzene was detected at 5.4 mg/kg and 11.5 mg/kg at 5 feet bgs and 10 feet bgs, respectively in B1260SB01 drilled at SWMU 4.18 during the SCOU RI (JEG, 1997a). Both detections exceeded the HHRA RAO for 1,4-dichlorobenzene (3.6 mg/kg). However, the subsequent excavation and confirmation sampling performed at SWMU 4.18 and described in Section 2.8.3.9, resulted in the removal of contaminants in excess of RAOs at SWMU 4.18.

After the Phase 2 RI, the BCT agreed that the B54 Group site was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of TCE contamination in soil gas. Furthermore, because the TCE soil gas plumes at ETC-5 (based on a previous investigation) and at the B54 Group site may have a common source, ETC-5 was assigned to the B54 Group site for further characterization of soil gas contamination during the remedial action. Results of the SVE Decision Study performed for the B51 Group described in Section 2.8.1.1 indicated that the B51 Group and B54 Group VOC plumes were contiguous (Earth Tech, 2000). Thus, results of the SVE Decision Study for the B51 Group are also applicable for the B54 Group.

A complete presentation of RI activities and results for the B54 Group site is provided in Sections 7.2.4 (B54), 7.2.28 (B1266), 7.2.40 (SWMU 4.6), 7.2.42 (Storage Area B3 [SA B3]) and 7.8.6 (ETC-5) of the *SCOU RI/FS* (JEG, 1997a).

Data gaps regarding TCE extent in the vicinity of ETC-5 and SA B3 were identified during the SCOU RI/FS. Since the proximity of ETC-5 and SA-B3 to B54 indicated a possible common source, ETC-5 and SA B3 were assigned to the B54 Group for further characterization during remedial action.

Human Health Risk Assessment

The HHRA quantified risk at B54, B1260, B1266, ST55, ST66, and ST67. The maximum cumulative residential risk for B54 was 3×10^{-8} and the non-cancer hazard index was 0.001. The maximum cumulative residential risk for B1266 was 4×10^{-8} and the non-cancer hazard index was 0.0003. The maximum cumulative residential risk for ST55 was 3×10^{-7} and the non-cancer hazard index was 0.02. The maximum cumulative residential risk for ST66 was 1×10^{-7} and the non-cancer hazard index was 0.002. The maximum cumulative residential risk for ST67 was 3×10^{-8} and the non-cancer hazard index was 0.0002. Human health risks were not calculated specifically for ETC-5 and SA-B3 since, as a result of the SCOU RI, the sites were not considered source areas and soil samples were not collected. However, ETC-5 and SA B3 were assigned to the B54 Group because soil gas detections of TCE at both sites were attributed to the B54 Group as the source area. Based on these results, B54, B1266, ETC-5, SA-B3, ST55, ST66 and ST67 do not pose an adverse risk to human health.

The maximum cumulative residential risk for B1260 was 1×10^{-5} and the non-cancer hazard index was 0.05. The primary COCs contributing to the risk at B1260 were 1,4-dichlorobenzene at SWMU 4.18 and methylene chloride (a lab contaminant), each contributing approximately 50 percent. However, the subsequent excavation performed at SWMU 4.18 and described in Section 2.8.3.9, resulted in the removal of 1,4-dichlorobenzene to non-detectable levels. Thus, risk based upon SCOU RI detections of 1,4-dichlorobenzene is no longer applicable at B1260. Additionally, risk based upon methylene chloride is not applicable since it was concluded to be a laboratory contaminant in the SCOU RI. No other

COPCs have an individual risk in excess of 1×10^{-6}. Based on the results of the HHRA and subsequent removal of 1,4-dichlorobenzene from SWMU 4.18, B1260 does not pose an adverse risk to human health.

Environmental Assessment

The concentrations of TCE (3,500 μg/L), cis-1,2-DCE (291 μg/L), and benzene (184 μg/L) in soil gas and TCE (1.5 mg/kg) and TVPH (840 mg/kg) in soil exceeded the WQSA thresholds (352.7 μg/L [VLEACH1] and 6.9 μg/L [VLEACH2] for TCE in soil gas at 30 to 40 feet bgs; 16 μg/L [VLEACH2] for cis-1,2-DCE at 10 to 20 feet bgs; 66.3 μg/L [VLEACH2] for benzene in soil gas at 10 to 20 feet bgs; 0.227 mg/kg [VLEACH1] and 0.005 mg/kg [VLEACH2] for TCE in soil at 40 to 50 feet bgs; 100 mg/kg for TVPH at 10 to 20 feet bgs). Accordingly, soil contamination at the B54 Group poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for the B54 Group are listed below.

COC (concentration)	RAO Source	RAO
TCE (3,500 μg/L, soil gas)	STOP	VLEACH2 – 6.9 μg/L, 30 to 40 feet bgs or lowest level technically and economically achievable
TCE (1.5 mg/kg, soil)	STOP	VLEACH2 - .005 mg/kg, 40 to 50 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (291μg/L, soil gas)	STOP	VLEACH2 - 16 μg/L, 10 to 20 feet bgs or lowest level technically and economically achievable
benzene (184 μg/L, soil gas)	STOP	VLEACH2 – 66.3 μg/L, 10 to 20 feet bgs or lowest level technically and economically achievable
TVPH (840 mg/kg, soil)	DLM	100 mg/kg

TCE in soil and soil gas, cis-1,2-DCE in soil gas, benzene in soil gas, and TVPH in soil represent an adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at the B54 Group.

Selected Remedy

The FS evaluated remedial alternatives for addressing VOCs in soil and soil gas and TVPH and TEPH in soil exceeding the WQSA thresholds. The preferred remedial alternative for the B54 Group published in the February 2001 *Revised Proposed Plan* was SVE and bioventing. However, the inclusion of bioventing as a component of the selected alternative was based upon a TEPH concentration (920 mg/kg) in exceedence of the preliminary RAO for TEPH (100 mg/kg) used in the SCOU FS. The subsequent revision of the TEPH RAO to 1,500 mg/kg resulted in the elimination of TEPH as a COC. Thus, the selected remedy for the Building 54 Group is SVE as discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of VOCs and TVPH to levels that no longer pose an adverse risk to groundwater quality. Implementation of SVE at the B54 Group was initiated in August 2001 as a removal action. The *Action Memorandum* (MWH, 2000) and *Design Report* (MWH, 2001b) were reviewed and approved by the BCT.

2.8.1.3 Building 1350

Site Description

The Building 1350 (B1350) hangar is located in grid Q, 12 (Plate 1, Appendix A) and a site map is included in Appendix E (Figure E-3). The hangar included hydraulic systems, electrical, environmental and four aircraft shops for the 93rd Field Maintenance Squadron. All four shops have floor drains that connect to the sanitary sewer lines on the east side of B1350. Two 25,000-gallon heating oil USTs and four sumps were located on the southwest end of the hangar, and there were two JP-4 vaults near the northeast end of the hangar that have been closed and sealed. A temporary (i.e., less than 90 days) hazardous waste accumulation point (SWMU 4.31) was located at the north end of B1350.

SWMU 4.31 was addressed in SCOU ROD Part 1 as a NFA site, and both USTs were removed in August 1996 in accordance with CCR Title 23 and with the approval of the RWQCB.

The land surrounding B1350 consists of asphalt and concrete paving and the building is on a concrete pad. Site B1350 is generally underlain by interbedded silts, sandy silts, silty sands, sands and occasional clays. The COPCs were oils, solvents, fuels and detergents. Potential sources of contamination were the USTs, floor drains to the sanitary sewer line and JP-4 vaults and pipelines.

Site Characterization

No documented investigations were performed at the B1350 site before the SCOU RI. During the Phase 1 RI, soil and soil gas samples were collected from suspected release areas at B1350. During the Phase 2 RI, additional soil samples were taken near the USTs to determine the extent of petroleum hydrocarbon contamination. Soil gas samples were taken at locations within and around B1350 to define the extent of the VOC plume. Soil and soil gas sampling locations for B1350 during the SCOU RI are provided in Appendix E (Figure E-3). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B1350 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
9	25	28	60

B1350 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs/BTEX	SW8260/SW8020
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

B1350 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
Petroleum Hydrocarbons	TEPH	2,700	15.5-16.5	mg/kg
Soil Gas Results				
VOCs	TCE	930	20-20.5	µg/L
	PCE	500	20-20.5	µg/L

Chlorinated VOCs (TCE and PCE) were detected in soil gas samples near the eastern corner of B1350 to a maximum depth of approximately 60 feet bgs. Diesel contamination was detected in soil samples collected near the USTs and JP4 vaults to a depth of approximately 20 feet bgs. The estimated extent of TCE soil gas contamination at B1350 is shown in Appendix E (Figure E-3).

Pursuant to the TEPH detections during the SCOU RI, the 2 USTs were removed by excavation in July 1996 (Laguna, 1997). The excavation was completed to a depth of 20 feet bgs. Confirmation samples were collected and analyzed for TEPH, and results verified the removal of TEPH to levels below RAOs. A closure report was prepared detailing the excavation activities and confirmation sampling results (Laguna, 1997). Closure of the B1350 USTs was approved by the RWQCB in 1997.

Based on the SCOU RI, the BCT agreed that B1350 was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of chlorinated VOC (TCE and PCE) contamination in soil gas. This additional characterization to support the remedial action was completed under the SVE Decision Study. The SVE Decision Study at B1350 included the installation of 5 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (15 total screens) were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE and PCE were detected at maximum concentrations of 236 µg/L and 113 µg/L, respectively in the laboratory samples (Earth Tech, 2000b). A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

B1350 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
5	15	15	5

B1350 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

B1350 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	TCE	236	50-60	µg/L
	PCE	113	50-60	µg/L

A complete presentation of RI activities and results for B1350, including SWMU 4.31, is provided in Section 7.2.10 of the *SCOU RI/FS* (JEG, 1997a). Results of the SVE Decision Study at B1350 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

The maximum cumulative residential risk was 2 x 10^{-8} and the non-cancer hazard index was 0.0002. Based on these results, Building 1350 does not pose an adverse risk to human health.

Environmental Assessment

TCE (930 µg/L at 20-20.5 feet bgs and 236 µg/L at 50 to 60 feet bgs) and PCE (500 µg/L at 20-20.5 feet bgs and 113 µg/L at 50 to 60 feet bgs) in soil gas exceeded the WQSA thresholds (559.1 µg/L [VLEACH1] and 10.6 µg/L [VLEACH2] for TCE at 20 to 30 feet bgs; 102.4 µg/L [VLEACH1] and 1.8 µg/L [VLEACH2] for TCE at 50 to 60 feet bgs; 10.6 µg/L [VLEACH2] for PCE at 20 to 30 feet bgs;

102.4 µg/L [VLEACH1] and 1.8 µg/L [VLEACH2] for PCE at 50 to 60 feet bgs). Accordingly, soil contamination at Building 1350 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for B1350 are listed below.

COC (concentration)	RAO Source	RAO
TCE (930 µg/L, soil gas)	STOP	VLEACH2 - 10.6 µg/L, 20 to 30 feet bgs or lowest level technically and economically achievable
TCE (236 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
PCE (500 µg/L, soil gas)	STOP	VLEACH2 – 10.6 µg/L, 20 to 30 feet bgs or lowest level technically and economically achievable
PCE (113 µg/L, soil gas)	STOP	VLEACH2 – 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE and PCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at B1350.

Selected Remedy

The FS evaluated remedial alternatives to address TCE and PCE in soil gas and TEPH in soil exceeding WQSA thresholds. The preferred remedial alternative for Building 1350 published in the February 2001 *Revised Proposed Plan* was SVE with supplemental intrinsic remediation and bioventing. However, the inclusion of intrinsic remediation and bioventing as a component of the preferred alternative was based upon the detection of TEPH in excess of the RAO during the SCOU RI. However, the TEPH was removed during UST excavation and removal in 1996. Thus, the selected remedy for B1350 is SVE as discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of TCE and PCE to levels that no longer pose an adverse risk to groundwater quality. Implementation of SVE at B1350 was initiated in October 2001 as a removal action. The *Action Memorandum* (MWH, 2001c) and *Design Report* (MWH, 2001d) were reviewed and approved by the BCT.

2.8.1.4 Building 1709

Site Description

The Building 1709 (B1709) site is located within the Weapons Storage area in grid L,13 (Plate 1, Appendix A) and a site map is shown in Appendix E (Figure E-4). B1709 was used as a special weapons maintenance shop. A sewer line serving the building leads to a septic tank and a leach field to the west of the building. Additionally, the building has two main floor drains that flow to a sump located outside the building.

The surface cover for the B1709 site and associated leach field is a combination of concrete, asphalt, grass and unpaved areas. The leach field is approximately 150 yards wide, 150 feet long and 10 feet to 15 feet deep. The soil beneath the B1709 site and leach field consists of sand, silty sands and silt. Silty sand predominates from the surface to 10 feet bgs, while silt is dominant from 10 feet to 20 feet bgs. A laterally continuous silt layer at 10 feet bgs may retain contaminants and promote lateral dispersion of contaminants at the B1709 leach field. A sandy clay layer is present from approximately 23 to 33 feet bgs beneath the leach field. Lateral dispersion at the leach field is further enhanced by the presence of large cobbles and clay leach field tiles.

The Air Force conducted a decommissioning survey of weapons storage bunkers at B1709 in 1995 to satisfy Nuclear Regulatory Commission requirements for license termination and release of the facility for unrestricted future use. The bunkers had been used exclusively for conventional and nuclear weapons storage since 1953. The bunker area was excluded from the Castle SCOU RI because radionuclide release from nuclear weapons was unlikely and the area was not designated as a potential hazardous release source.

A 2,000-gallon UST used for storing heating oil, located north of B1709, was removed in March 1996 (Laguna, 1997) in accordance with CCR Title 23 requirements and with the approval of the RWQCB.

COPCs included solvents, paints, thinners, lacquers, enamels and cleaning compounds. Potential sources of contamination at B1709 and the leach field were the floor drains, sump, sanitary sewer line and septic tank.

Site Characterization

A previous investigation reported low levels (less than 2.5 µg/L) of TCE in groundwater approximately 1/2 mile downgradient of B1709. TCE (up to 45 µg/L) was reported in a well near the leach field. During the Phase 1 RI, soil and soil gas samples were collected near the floor drains and drainage areas. During the Phase 2 RI and SCOU RI/FS Update, additional soil, soil gas and groundwater (HydroPunch) samples were collected from the leach field and B1709 surroundings. Soil and soil gas sampling locations during the SCOU RI are provided in Appendix E (Figure E-4). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B1709 SCOU RI Sampling Summary				
Soil Borings	Soil Gas Probes	Soil Samples	Groundwater (HydroPunch) Samples	Soil Gas Samples
10	27	26	2	64

B1709 SCOU RI Analysis Summary	
Contaminant Category	Analytical Method
Soil/Groundwater Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Lead	SW7421
Arsenic	SW7060
Selenium	SW7740
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

B1709 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Results				
Metals	Lead	12.4 (7.4)	15.5-16.5	mg/kg
SVOCs	Di-n-Butyl Phthalate	0.47	15.5-16.5	mg/kg
Soil Gas Results				
VOCs	Vinyl Chloride	101	10	µg/L
	TCE	53	20	µg/L
	Toluene	24	21.5	µg/L
	1,1-DCE	8.5	10	µg/L
Groundwater (HydroPunch) Results				
VOCs	TCE	14	60-60.5	µg/L
	Toluene	1.3	70-70.5	µg/L

Note
* Corresponding TBV is listed in parentheses.

Chlorinated VOCs (TCE, vinyl chloride, and 1,1-DCE) and toluene were detected in soil gas samples from B1709 to a depth of approximately 70 feet bgs. TCE and toluene were also detected in groundwater (HydroPunch) samples in the depth range of 69-74 feet bgs. SVOCs and lead (> TBVs) were detected in soil samples to a depth of approximately 15 feet bgs. Lead was detected in a single sample only at 15 feet bgs. Since lead was not detected in shallower soil and there was no identified source of lead at B1709, it was not considered anthropogenic. The estimated extent of TCE and vinyl chloride soil gas plumes are shown in Appendix E (Figure E-4).

Based on the SCOU RI, the BCT agreed that B1709 was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of chlorinated VOC (TCE, vinyl chloride, and 1,1-DCE) contamination in soil gas. This additional characterization to support the remedial action was completed under the SVE Decision Study. The SVE Decision Study at B1709 included the installation of 4 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (12 total screens) were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE was detected at a maximum concentration of 26.28 μg/L and PCE at 0.62 μg/L (Earth Tech, 2000b) in the laboratory samples. A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

B1709 SVE Decision Study Sampling Summary			
Vapor Wells	Vapor Well Screens	Field GC Vapor Samples	Laboratory Vapor Samples
4	12	12	4

B1709 SVE Decision Study Analysis Summary	
Contaminant Category	Analytical Method
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

B1709 SVE Decision Study Maximum Detections				
Contaminant Category	Contaminant of Potential Concern	Maximum Concentration	Depth (feet bgs)	Units
Soil Gas Results				
VOCs	1,2,4-trimethylbenzene	0.03	50-65	μg/L
	4-ethyl toluene	0.03	50-65	μg/L
	chlorobenzene	0.25	50-65	μg/L
	chloroform	0.07	50-65	μg/L
	cis-1,2-DCE	0.35	50-65	μg/L
	PCE	0.62	50-65	μg/L
	toluene	0.05	50-65	μg/L
	TCE	26.28	50-65	μg/L
	xylenes (m,p)	0.06	50-65	μg/L

A complete presentation of RI activities and results for the B1709 is provided in Section 7.8.2 of the SCOU RI/FS (JEG, 1997a). Results of the SVE Decision Study at B1709 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

No contamination above risk-screening levels was identified at B1709 during the RI. Thus, the HHRA concluded that B1709 does not pose an adverse risk to human health.

Environmental Assessment

TCE (53 µg/L at 20 feet bgs, 26.3 µg/L at 50-65 feet bgs) exceeded WQSA thresholds (19 µg/L [VLEACH2] for TCE at 10 to 20 feet bgs; 1.8 µg/L [VLEACH2] for TCE at 50 to 60 feet bgs). Accordingly, soil contamination at B1709 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for B1709 are listed below.

COC *(concentration)*	RAO Source	RAO
TCE (53 µg/L, soil gas)	STOP	VLEACH2 - 19 µg/L, 10 to 20 feet bgs or lowest level technically and economically achievable
TCE (26.3 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE in soil gas represents adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at Building 1709.

Selected Remedy

The FS evaluated alternatives to address TCE in excess of WQSA thresholds. The selected remedial alternative for B1709 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. SVE system design, including data gathering via a small scale SVE system, is currently being performed at B1709 in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000b) approved by the BCT. Completion of a site-specific START analysis will determine if SVE must be continued or can be terminated. Implementation of the selected remedy will reduce concentrations of TCE to levels that no longer pose an adverse risk to groundwater quality.

2.8.1.5 Building 1762

Site Description

Building 1762 (B1762), historically used as a weapons and aircraft maintenance shop, is located in grid K,13 (Plate 1, Appendix A) along the northeast side of the runway in the conventional weapons storage area. A site map is provided in Appendix E (Figure E-5). A sanitary sewer line runs southwest from the building to a septic tank and leach field. A large weapons storage bunker was located to the northwest of B1762, forming a narrow access corridor between the bunker and B1762.

The surface cover for the B1762 site is a combination of concrete, asphalt, grass, gravel and native soil; the B1762 leach field is a grass-covered field. Concrete surrounds B1762 on two sides, while the outlying areas of B1762 are bounded by asphalt roads. Within the site, gravel covers the areas not covered by concrete. Surface soils consist of silty sands and silt, which extend into the subsurface. Silts dominate the upper 50 feet bgs of soil, with some interbedded silty sands up to 10 feet thick. A relatively continuous sand layer is present at nominal depths of 50 feet bgs.

A 1,000-gallon UST used for storing heating oil, located east of B1762, was removed in December 1993 in accordance with CCR Title 23 and with the approval of the RWQCB. Further investigation was done at this former UST site in September 1996.

COPCs included fuels, solvents, paints, thinners, lacquers and enamels. Potential sources of contamination at B1762 and the leach field were the floor drains, UST, sanitary sewer line and septic tank.

Site Characterization

A previous investigation reported TCE (up to 21.2 parts per billion [ppb]) in soil gas samples collected near the leach field. During the Phase 1 RI, soil samples were collected near the UST and septic tank and along the sanitary sewer line, while soil gas samples were taken throughout the leach field and B1762 surroundings. During the Phase 2 RI, step-out soil borings were drilled and soil and soil gas samples were collected near the UST and drainage pipeline to further define the extent of VOC contamination. Soil gas samples were also collected from discolored soil north of B1762. Soil and soil gas sampling locations during the SCOU RI are provided in Appendix E (Figure E-5). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B1762 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
10	19	25	41

B1762 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

B1762 SCOU RI Maximum Detections				
Contaminant Category	Contaminant of Potential Concern	Maximum Concentration*	Depth (feet bgs)	Units
Soil Results				
VOCs	TCE	0.23	44-45	mg/kg
Metals	Lead	11 (7.4)	20.5-21.5	mg/kg
Soil Gas Results				
VOCs	TCE	306	50-50.5	µg/L
	1,1-DCE	150	21.5	µg/L
	Toluene	6.0	21.5	µg/L
Note * Corresponding TBV is listed in parentheses.				

Chlorinated VOCs (TCE and 1,1-DCE) were detected in soil and soil gas samples from B1762 to a depth of approximately 50 feet bgs. Toluene was also detected in soil gas samples to a depth of approximately 20 feet bgs. Lead (>TBV) was detected in a single soil sample at a depth of approximately 20 feet bgs. Since lead was not detected in shallower soil and there was no identified source for lead at B1762, it was not considered anthropogenic. The estimated extent of the TCE plume in soil gas is shown in Appendix E (Figure E-5).

Based on the SCOU RI, the BCT agreed that B1762 was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of TCE contamination in soil gas. This additional characterization to support the remedial action was completed under the SVE Decision Study. The SVE Decision Study at B1762 included the installation of 4 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (12 total screens) were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE was detected at a maximum concentration of 172 µg/L (Earth Tech, 2000b) in the laboratory samples. A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

B1762 SVE Decision Study Sampling Summary			
Vapor Wells	Vapor Well Screens	Field GC Vapor Samples	Laboratory Vapor Samples
4	12	12	4

B1762 SVE Decision Study Analysis Summary	
Contaminant Category	Analytical Method
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

B1762 SVE Decision Study Maximum Detections				
Contaminant Category	Contaminant of Potential Concern	Maximum Concentration	Depth (feet bgs)	Units
Soil Gas Results				
VOCs	1,1-DCE	0.32	50-65	μg/L
	chlorobenzene	0.31	50-65	μg/L
	chloromethane	0.09	50-65	μg/L
	1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	11.20	50-65	μg/L
	TCE	171.84	50-65	μg/L

A complete presentation of RI activities/results for the Building 1762 site is provided in Section 7.8.3 of the *SCOU RI/FS* (JEG, 1997a). Results of the SVE Decision Study at B1762 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

The maximum cumulative residential risk was 2 x 10^{-8} and the non-cancer hazard index was 0.0004. Based on these results, Building 1762 does not pose an adverse risk to human health.

Environmental Assessment

TCE in soil gas (306 μg/L) and soil (0.230 mg/kg) exceeded WQSA thresholds (102.4 μg/L [VLEACH1] and 1.8 μg/L [VLEACH2] at 50 to 60 feet bgs; 0.227 mg/kg [VLEACH1] and 0.005 mg/kg [VLEACH2] at 40 to 50 feet bgs). 1,1-DCE in soil gas (150 µg/L) exceeded WQSA thresholds (20.1 µg/L [VLEACH2] at 20 to 30 feet bgs). Accordingly, soil contamination at Building 1762 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for B1762 are listed below.

COC (concentration)	RAO Source	RAO
TCE (306 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
TCE (0.230 mg/kg, soil)	STOP	VLEACH2 - 0.005 mg/kg, 40 to 50 feet bgs or lowest level technically and economically achievable
1,1-DCE (150 µg/L, soil gas)	STOP	VLEACH2 – 20.1 µg/L, 20 to 30 feet bgs or lowest level technically and economically achievable

TCE in soil and soil gas and 1,1-DCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at Building 1762.

Selected Remedy

The FS evaluated remedial alternatives to address TCE and 1,1-DCE exceeding the WQSA thresholds. The selected remedial alternative for Building 1762 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of TCE and 1,1-DCE to levels that no longer pose an adverse risk to groundwater quality. Implementation of SVE at B1762 was initiated as a removal action in December 2001. The *Action Memorandum* (MWH, 2001c) and *Design Report* (MWH, 2001d) were reviewed and approved by the BCT.

2.8.1.6 Discharge Area 4

Site Description

Discharge area 4 (DA-4) is located in grid K,8 (Plate 1, Appendix A) and a site map is included in Appendix E (Figure E-6). The site included a liquid oxygen (LOX) manufacturing and storage facility, which operated from the early 1950s until the mid 1960s. Solvents (including TCE) were used to clean the filters at this facility. There were four ASTs associated with the LOX facility: two 5,000-gallon LOX tanks and two nitrogen tanks (2,000- and 4,000-gallon). According to CAFB records, the solvents were discharged to surface or subsurface soils through a shallow trench and French drain system. The site includes Building 1314 (B1314), which was used as a tool shed. A former UST was located northeast of B1314 and an underground fuel line runs east of the building.

The ground surface at DA-4 is covered with a combination of asphalt, concrete pavement and native soil. The sediments underlying DA-4 are predominately coarse-grained soils (sands and silty sands) extending from the surface to approximately 40-45 feet bgs. Thin discontinuous interbeds of fine-grained sediments (silt and clay) are present locally. From 40-50 feet bgs, a continuous silt and sandy silt layer is present. Below that stratum, a sand layer extends to approximately 55 feet bgs.

The COPCs included solvents, detergents, acids and oil and grease associated with the LOX manufacturing and filter cleaning operations. Possible sources of contamination were the French drain, UST and underground fuel line.

Site Characterization

Previous investigations detected antimony (25 mg/kg) and beryllium (2.0 mg/kg) above TBVs in soil samples. VOCs, including TCE up to 1,700 ppb, were detected in soil gas samples collected near the LOX pad. During the Phase 1 RI, soil and soil gas samples were collected from suspected release areas, including the French drain, drainage trench and underground fuel line. During the Phase 2 RI, step-out soil borings were drilled near the former UST location and French drain and soil and soil gas samples were collected to determine the extent of contamination surrounding these suspected sources. Soil and soil gas sampling locations for DA-4 during the SCOU RI are provided in Appendix E (Figure E-6). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

DA-4 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
22	9	73	58

DA-4 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

DA-4 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	TCE	240	19.5-20	mg/kg
Soil Gas Results				
VOCs	TCE	9,115	30	µg/L
	cis-1,2-DCE	440	5	µg/L

Chlorinated VOCs were detected in soil and soil gas samples to respective depths of approximately 40 and 60 feet bgs. The estimated extent of the TCE in soil gas is shown in Appendix E (Figure E-6).

After the Phase 2 RI, the BCT agreed that the DA-4 site was sufficiently characterized to support selection of an appropriate remedy. However, the BCT decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of TCE contamination at DA-4.

A complete presentation of RI activities/results for the Discharge Area 4 (DA-4) site is provided in Section 7.6.1 of the SCOU RI/FS (JEG, 1997a).

Human Health Risk Assessment

The maximum cumulative residential risk was 5 x 10^{-8} and the non-cancer hazard index was 0.003. Based on these results, DA-4 does not pose an adverse risk to human health.

Environmental Assessment

TCE (240 mg/kg in soil; 1,000 μg/L in soil gas, 9,115 μg/L in soil gas) and cis-1,2-DCE (0.100 mg/kg in soil; 440 μg/L in soil gas) exceeded WQSA thresholds (1.0 mg/kg [VLEACH1] and .018 mg/kg [VLEACH2] for TCE in soil at 10 to 20 feet bgs; 19.0 μg/L [VLEACH2] for TCE in soil gas at 10 to 20 feet bgs; 538.7 [VLEACH1] and 10.6 μg/L [VLEACH2] for TCE in soil gas at 20 to 30 feet bgs; 0.008 mg/kg [VLEACH2] for cis-1,2-DCE at 10 to 20 feet bgs; 40.7 [VLEACH2] for cis-1,2-DCE at 0 to 10 feet bgs). Accordingly, soil contamination at DA-4 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for DA-4 are listed below.

COC (concentration)	RAO Source	RAO
TCE (240 mg/kg, soil)	STOP	VLEACH2 - .018 mg/kg, 10 to 20 feet bgs or lowest level technically and economically achievable
TCE (1,000 μg/L, soil gas)	STOP	VLEACH2 - 19 μg/L, 10 to 20 feet bgs or lowest level technically and economically achievable
TCE (9,115 μg/L, soil gas)	STOP	VLEACH2 – 10.6 μg/L, 20 to 30 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (0.100 mg/kg, soil)	STOP	VLEACH2 - 0.008 mg/kg, 10 to 20 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (440 μg/L, soil gas)	STOP	VLEACH2 – 40.7 μg/L, 0 to 10 feet bgs or lowest level technically and economically achievable

TCE and cis-1,2-DCE in soil and soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at DA-4.

Selected Remedy

The FS evaluated remedial alternatives addressing TCE and cis-1,2-DCE in soil and soil gas exceeding WQSA thresholds. The selected remedial alternative for DA-4 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. SVE was performed as a removal action from August 1996 to January 1997 (JEG, 1998). The *Action Memorandum* (USAF, 1995) and *Design Report* (JEG, 1996b) were reviewed and approved by the BCT. SVE was restarted in November 2001 pursuant to the *SVE Decision Study Work Plan* (Earth Tech, 2000b) approved by the BCT, in order to address low level TCE contamination in soil gas. Preliminary results of the SVE Decision Study at DA-4 indicate that the French drain impedes subsurface vapor flow, and excavation will be required to remove residual VOCs near the French drain upon completion of SVE. Thus, excavation has been added as a component of the selected remedy for DA-4. Implementation of the selected remedy will reduce concentrations of TCE and cis-1,2-DCE to levels that no longer pose an adverse risk to groundwater quality.

2.8.1.7 Discharge Area 5

Site Description

Discharge Area 5 (DA-5) is located in grid Q,13 (Plate 1, Appendix A) and a site map is provided in Appendix E (Figure E-7). DA-5 is a system of catchment facilities and pipelines associated with the main aircraft washrack (B1529). The DA-5 site includes SWMU 4.1, which encompasses two hazardous waste storage (HWS) areas (HWS-2 and HWS-5), where hazardous waste containers were stored on concrete pads, two OWSs (SWMU 4.20 at B1509 and SWMU 4.21 at B1523), two ASTs (SWMU 4.3), an equipment house (B1521), a drainage ditch (approximately 3 feet deep) and a catchment basin (SWMU 4.38). Contaminated water containing detergents and solvents flowed directly from the washrack to the OWSs. Waste oil from the OWSs was stored in the AST. On certain occasions, the separators were reportedly bypassed, allowing contaminants to flow directly into the drainage ditch. The washrack and OWSs were in operation from the 1950s until base closure in 1995.

SWMUs 4.1, 4.20, and 4.38 are included in SCOU ROD Part 1 as NFA sites. The AST (SWMU 4.3) was removed in July 1996 (Laguna, 1997) in accordance with CCR Title 23, and is addressed separately in section 2.8.2.1. SWMU 4.21 is addressed separately in section 2.8.2.5.

The washrack area is constructed of concrete and much of the surrounding access area is paved. Drainage from the paved areas flows directly to the storm water control ditch. Surface runoff in the washrack and access areas is directed to storm drain gates or to the catchment basin. The subsurface lithology consists of sands, silty sands and silts. The predominant lithology in the upper 25 feet bgs of the subsurface is silty sand, with some lenses of sand (usually about 5 feet thick) present in the central portion of DA-5. A discontinuous silt layer, about 5 feet thick, is present at 20 feet bgs. From 25 feet to 50 feet bgs, the predominant lithology is sand, with small, discontinuous lenses of silt and silty sand. Interbedded silt and silty sand are present at 55 feet bgs.

The COPCs were detergents, degreasers, fuels, oils, solvents, pesticides and other chemicals (liquid fire retardant) associated with washrack operations. Potential sources of contamination were the washrack, OWS, AST, HWS pads, drainage ditch and catchment basin.

Site Characterization

Previous investigations at DA-5 included a Phase II, Stage 1 investigation and separate tank investigation in 1985 and an RI in 1987 and 1990. Soil borings were drilled near the suspected source areas and soil samples were collected. The 1987 RI included a soil gas survey. VOCs were detected in the soil gas samples (up to 10,000 ppbv). Gasoline (up to 23,000 mg/kg), jet fuel (up to 36,000 mg/kg) and oil and grease (up to 1,300 mg/kg) were detected in soil samples. The highest levels of contamination were found near the OWS, washrack and equipment house.

During the Phase 1 SCOU RI, soil borings were drilled near potential sources (i.e., OWS, equipment house, drainage ditch and HWS pads) and soil and soil gas samples were collected to confirm the historical data and further characterize site contamination. During the Phase 2 RI, additional soil, soil gas and groundwater (HydroPunch) samples were collected in the northeast and northwest regions of the DA-5 site to determine the extent of VOC and petroleum hydrocarbon contamination. Soil, soil gas and groundwater sampling locations for the DA-5 site during the SCOU RI are provided in Appendix E (Figure E-7). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

DA-5 SCOU RI Sampling Summary					
Site Location	**Soil Borings**	**Soil Gas Probes**	**Soil Samples**	**Groundwater (HydroPunch) Samples**	**Soil Gas Samples**
DA-5	30	0	112	2	91
SWMUs 4.20/4.38	6	7	18	0	26
B1529	3	15	3	0	25
Totals:	**39**	**22**	**133**	**2**	**142**

DA-5 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil/Groundwater Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Pesticides/PCBs	SW8080
Organophosphorous Pesticides	SW8140
Chlorinated Herbicides	SW8150
Metals	SW6010
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

DA-5 SCOU RI Maximum Detections				
Contaminant Category	Contaminant of Potential Concern	Maximum Concentration*	Depth (feet bgs)	Units
Soil Results				
VOCs	TCE	0.0075	49-50	mg/kg
	Benzene	0.021	14-15	mg/kg
	Xylenes	24	2.5-3	mg/kg
	cis-1,2-DCE	0.074	14-15	mg/kg
	Toluene	0.033	14-15	mg/kg
Petroleum Hydrocarbons	TVPH	900	4-4.5	mg/kg
	TEPH	26,000	2.5-3	mg/kg
PAHs	Benzo(a)anthracene	0.05	2-3	mg/kg
	Benzo(a)pyrene	0.065	2-3	mg/kg
Metals	Lead	106 (7.4)	2-3	mg/kg
	Boron	40.4 (20)	19-20	mg/kg
	Barium	610 (319)	2-3	mg/kg
	Cadmium	2.6 (0.5)	4-5	mg/kg
	Cobalt	35.5 (12.8)	2-3	mg/kg
	Chromium	62.9 (29.4)	2-3	mg/kg
	Copper	58.6 (53.6)	2-3	mg/kg
Groundwater (HydroPunch) Results				
VOCs	TCE	0.8	69-73	µg/L
	Toluene	0.24	69-73	µg/L
SVOCs	Di-n-Butyl Phthalate	1.8	69-73	µg/L
Soil Gas Results				
VOCs	cis-1,2-DCE	140.4	31.5-32	µg/L
	TCE	13.5	31.5-32	µg/L
	Benzene	33.6	31.5-32	µg/L
	Xylenes	126	11.5-12	µg/L
Note * The corresponding TBVs are listed in parentheses.				

Chlorinated (TCE and cis-1,2-DCE) and aromatic (benzene, toluene, ethylbenzene, and xylenes [BTEX]) VOCs were detected in soil and soil gas samples from DA-5 to respective depths of approximately 50 and 40 feet bgs. Methylene chloride was detected in soil but was also detected in the laboratory blank and subsequently qualified as laboratory contamination. Petroleum hydrocarbons (gasoline and diesel) were detected in soil samples to a depth of approximately 44 feet bgs and were associated with the OWS

(SWMU 4.21) and former ASTs (SWMU 4.3). Metals were detected above TBVs in surface and subsurface soil samples to a depth of approximately 50 feet bgs. Trace concentrations of PAHs were detected in shallow soil samples to a depth of approximately 2 feet bgs. Low concentrations of VOCs and SVOCs were detected in groundwater (HydroPunch) samples collected at approximately 70 feet bgs. The estimated extent of VOC contamination in soil gas is shown in Appendix E (Figure E-7).

After the Phase 2 RI, the BCT decided that the DA-5 site was not sufficiently characterized to support selection of an appropriate remedy and that further assessment of the extent of gasoline/diesel contamination and nature of metals contamination was required. Additional soil samples were analyzed for VOCs, TVPH, TEPH, and metals and soil gas samples were analyzed for VOCs during the Data Gap Investigation. The sampling and analysis were performed in accordance with the SCOU Data Gap Field Sampling Plans approved by the BCT. Detected compounds in soil included TEPH (4,800 mg/kg), TVPH (804 mg/kg), benzene (0.005 mg/kg), and cis-1,2-DCE (.009 mg/kg). Additionally, lead, cadmium and silver were detected above TBVs; however, they were concluded to be naturally occurring and representative of background variation. TCE was detected in soil gas at concentrations warranting further characterization. A summary of the number and types of samples, analyses, and maximum detections during the Data Gap Investigation is presented below.

DA5 Data Gap Sampling Summary			
Soil Borings	**Soil Vapor Wells**	**Soil Samples**	**Soil Gas Samples**
15	3	51	40

DA5 Data Gap Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	TO-14

DA5 Data Gap Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,1-Dichloroethane	10.227	31.5	µg/L
	1,1-DCE	0.521	31.5	µg/L
	1,1,1-Trichloroethane	0.026	31.5	µg/L
	1,2,4-Trimethylbenzene	22.848	11.5	µg/L
	1,3,5-Trimethylbenzene	9.934	11.5	µg/L
	4-Ethyl toluene	21.322	11.5	µg/L
	Acetone	1.198	31.5	µg/L
	Benzene	14.845	31.5	µg/L
	Bromomethane	0.005	11.5	µg/L
	Carbon disulfide	0.053	11.5	µg/L
	Chloroform	0.157	31.5	µg/L
	cis-1,2-DCE	60.124	31.5	µg/L
	Ethylbenzene	10.971	11.5	µg/L
	2-butanone (MEK)	0.186	10.5	µg/L
	Methyl isobuty ketone	0.031	10.5	µg/L
	Methylene chloride	0.239	23	µg/L
	n-hexane	18.522	31.5	µg/L
	Styrene	0.009	20.5	µg/L
	PCE	2.604	41.5	µg/L
	Toluene	4.562	31.5	µg/L
	trans-1,2-DCE	1.12	31.5	µg/L
	TCE	29.231	31.5	µg/L
	Trichlorofluoromethane (Freon 11)	0.009	50.5	µg/L
	Vinyl Chloride	0.247	12.5	µg/L
	Xylenes	38.545	11.5	µg/L
Soil Results				
VOCs	Benzene	5.49	10.5	µg/kg
	cis-1,2-DCE	9.3	10.5	µg/kg
	Naphthalene	6.93	10.5	µg/kg
	trans-1,2-DCE	12	10.5	mg/kg
Petroleum Hydrocarbons	TEPH	4,800	0.5	mg/kg
	TVPH	804	0.5	mg/kg

Pursuant to post-SCOU RI concerns of the BCT that TCE in soil gas required additional characterization at DA-5, additional soil gas characterization work at DA-5 was performed under the SVE Decision Study. The SVE Decision Study at DA-5 included the installation of 3 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (9 total screens) were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE and PCE were detected at maximum concentrations of 20.9 µg/L and 8 µg/L, respectively. Cis-1,2-DCE was detected up to 13.90 µg/L, and methylene chloride was not detected. A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below (Earth Tech, 2000b).

DA5 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
3	9	9	3

DA5 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

DA5 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,1-dichloroethane	0.34	40-60	µg/L
	1,2,4-trimethylbenzene	0.03	40-60	µg/L
	4-ethyl toluene	0.03	40-60	µg/L
	chloroform	0.10	40-60	µg/L
	cis-1,2-DCE	13.90	40-60	µg/L
	ethylbenzene	0.01	40-60	µg/L
	PCE	8.14	40-60	µg/L

DA5 SVE Decision Study Maximum Detections				
	toluene	0.05	40-60	µg/L
	trans-1,2-DCE	0.14	40-60	µg/L
	TCE	20.94	40-60	µg/L
	xylenes (m,p)	0.06	40-60	µg/L
	xylene (o)	0.02	40-60	µg/L

A complete presentation of RI activities and results for DA-5 is provided in Section 7.2.14a of the *SCOU RI/FS* (JEG, 1997a). SCOU RI/FS summaries for associated sites SWMUs 4.20 and 4.38, and B1529 are found in Sections 7.2.14b/c and 7.2.14d, respectively. A complete discussion of activities and results for the Data Gap Investigation at DA-5 is presented in Section 4.4 of the *SCOU Data Gap Investigation Report* (JEG, 1999). Results of the SVE Decision Study at DA-5 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

The maximum cumulative residential risk is 6 x 10^{-7} for surface soil and 1 x 10^{-6} for subsurface soil. The surface soil value reflects an adjustment from the surface soil value reported for DA-5 in Appendix C. The cancer risk value for DA-5 listed in Appendix C was calculated using a different Henry's constant for methylene chloride than was used to calculate the risk-based RAO for methylene chloride. Risk for DA-5 was reported in the HHRA update to be 3 x 10^{-6} for surface soil. When the same Henry's constant that was used to calculate the RAO is used to calculate the DA-5 risk, the maximum cumulative residential risk is 6 x 10^{-7} for surface soil and 1 x 10^{-6} for subsurface soil. The non-cancer hazard index is 0.18 for surface soil and 0.02 for subsurface soil. Based on these results, DA-5 does not pose an adverse risk to human health.

Environmental Assessment

TVPH (804 mg/kg), TEPH (4,800 mg/kg), cis-1,2-DCE (0.074 mg/kg), and TCE (0.008 mg/kg) in soil, and benzene (33.6 µg/L), cis-1,2-DCE (140.4 µg/L at 31.5 feet bgs and 13.9 µg/L at 40 to 60 feet bgs), TCE (29.2 µg/L at 31.5 feet bgs and 20.9 µg/L at 40 to 60 feet bgs) and PCE (8 µg/L) in soil gas exceeded WQSA thresholds (100 mg/kg for TVPH in soil at 0 to 10 feet bgs; 1,500 mg/kg for TEPH in soil at 0 to 10 feet bgs; 0.008 mg/kg [VLEACH2] for cis-1,2-DCE at 10 to 20 feet bgs; 0.005 mg/kg

[VLEACH2] for TCE at 40 to 50 feet bgs; 5.9 µg/L [VLEACH2] for benzene at 30 to 40 feet bgs; 6.1 µg/L [VLEACH2] for cis-1,2-DCE at 30 to 40 feet bgs; 1.8 µg/L [VLEACH2] for cis-1,2-DCE at 50 to 60 feet bgs; 6.9 µg/L [VLEACH2] for TCE at 30 to 40 feet bgs; 1.8 µg/L [VLEACH2] for TCE at 50 to 60 feet bgs; 1.8 µg/L [VLEACH2] for PCE at 50 to 60 feet bgs). Accordingly, soil contamination at DA-5 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for DA-5 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (804 mg/kg, soil)	DLM	100 mg/kg
TEPH (4,800 mg/kg, soil)	DLM	1,500 mg/kg
benzene (33.6 µg/L, soil gas)	STOP	VLEACH2 – 5.9 µg/L, 30 to 40 feet bgs or lowest level technically or economically achievable
cis-1,2-DCE (0.074 mg/kg, soil)	STOP	VLEACH2 – 0.008 µg/L, 10 to 20 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (140.4 µg/L, soil gas)	STOP	VLEACH2 - 6.1 µg/L, 30 to 40 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (13.9 µg/L, soil gas)	STOP	VLEACH2 – 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
TCE (0.008 mg/kg, soil)	STOP	VLEACH2 - 0.005 mg/kg, 40 to 50 feet bgs or lowest level technically and economically achievable
TCE (29.2 µg/L, soil gas)	STOP	VLEACH2 - 6.9 µg/L, 30 to 40 feet bgs or lowest level technically and economically achievable
TCE (20.9 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
PCE (8 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TVPH, TEPH, cis-1,2-DCE, and TCE in soil, and benzene, cis-1,2-DCE, TCE, and PCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at DA-5.

Selected Remedy

The FS and Data Gap Investigation evaluated remedial alternatives to address TVPH and TEPH in soil, and VOCs in soil and soil gas. The preferred remedial alternative for DA-5 published in the February 2001 *Revised Proposed Plan* was SVE with supplemental excavation, bioventing, and intrinsic remediation. The components of the preferred alternative apply to all CERCLA sites within DA-5, including SWMU 4.3 and SWMU 4.21, addressed in Sections 2.8.2.1 and 2.8.2.5, respectively.

The selected remedy for DA-5 is SVE and excavation as discussed in Section 2.12 of this ROD. The bioventing component of the preferred alternative (in addition to excavation) is applicable to SWMUs 4.3 and 4.21. Implementation of the selected remedy will reduce concentrations of TVPH, TEPH, benzene, cis-1,2-DCE, TCE, and PCE to levels that no longer pose an adverse risk to groundwater quality. Implementation of SVE at DA-5 was initiated in October 2001 as a removal action. The *Action Memorandum* (MWH, 2001c) and *Design Report* (MWH, 2001d) were reviewed and approved by the BCT.

2.8.1.8 Aircraft Hangar F-4

Site Description

Aircraft Hangar F-4 (F-4) is located northwest of Building 1350 and southwest of adjacent aircraft hangars F-5 and F-6, in grid Q,11 (Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-8). The site was identified as a former aircraft hangar (prior to 1967) during a review of aerial photographs. This location now consists of a concrete pad surrounded by asphalt pavement with floor and storm drains. The underground JP-4 pipeline passes through this site. Information regarding the activities or materials handled at this site was not available.

The F-4 site is mostly paved with asphalt and concrete to provide adequate foundations for aircraft support. Even if low boiling-point solvents were released on paved surfaces, it is unlikely they would have penetrated the paved surface in the area. Therefore, it is unlikely that TCE was released and dispersed at the surface. The subsurface soils at the F-4 site consist mainly of silty sand to approximately

20 feet to 30 feet bgs. Silt dominates from approximately 25 feet to 40 feet bgs. The sediment beneath 40 feet bgs is predominantly sand to a depth of at least 60 feet bgs.

Based on usage at similar facilities, the suspected COPCs were fuels, lubricating oils and solvents. The targeted potential sources associated with F-4 were the underground discharge pipelines.

Site Characterization

No documented investigations were performed at the F-4 site before the SCOU RI. During the Phase 1 SCOU RI, soil samples were collected near the floor drain and storm drain and soil gas samples were taken around the perimeter of the concrete pad. During the Phase 2 RI, additional samples were collected to better define the nature and extent of VOCs and metals. Soil and soil gas sampling locations for F-4 during the SCOU RI are provided in Appendix E (Figure E-8). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

F-4 SCOU RI Sampling Summary			
Soil Borings	Soil Gas Probes	Soil Samples	Soil Gas Samples
4	9	10	28

F-4 SCOU RI Analysis Summary	
Contaminant Category	Analytical Method
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Chromium (Hexavalent)	SW7196
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

F-4 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Results				
Metals	Zinc	84.5 (70.2)	0.5-1	mg/kg
	Cadmium	0.65 (0.5)	19.5-20.5	mg/kg
Soil Gas Results				
VOCs	TCE	76	60-60.5	µg/L
	cis-1,2-DCE	0.21	35-35.5	µg/L
Note * Corresponding TBVs are listed in parentheses.				

Chlorinated VOCs (TCE and cis-1,2-DCE) were detected in soil gas samples from F-4 to a depth of approximately 60 feet bgs. Metals (>TBVs) were detected in surface (zinc) and subsurface (cadmium at 19.5 feet bgs) soil samples. The limited number of detections above TBVs and the widely different depths of detection suggested that these metals were not anthropogenic. The estimated extent of the TCE soil gas plume is shown in Appendix E (Figure E-8).

Based on the SCOU RI, the BCT agreed that F-4 was sufficiently characterized to support selection of an appropriate remedy, but decided that additional sampling and analysis would be required during the remedial action to refine estimates of the extent of TCE contamination in soil gas. This additional characterization to support the remedial action was completed under the SVE Decision Study. The SVE Decision Study at F-4 included the installation of 5 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of each vapor well (15 total screens) were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading for each vapor well was sampled in a SUMMA canister and analyzed at a laboratory for VOCs. TCE and PCE were detected at maximum concentrations of 69.7 µg/L and 1.83 µg/L, respectively in the laboratory samples (Earth Tech, 2000b). A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

F-4 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
5	15	15	5

F-4 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

F-4 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	chlorobenzene	0.25	45-60	µg/L
	cis-1,2-DCE	0.30	45-60	µg/L
	PCE	1.83	45-60	µg/L
	toluene	0.05	45-60	µg/L
	TCE	69.81	45-60	µg/L
	xylenes (m,p)	0.08	45-60	µg/L

A complete presentation of RI activities and results for the F-4 site is provided in Section 7.2.43 of the SCOU RI/FS (JEG, 1997a). Results of the SVE Decision Study at F-4 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b).

Human Health Risk Assessment

The maximum residential cumulative risk was 2 x 10^{-8} and the non-cancer hazard index was 0.0001. Based on these results, F-4 does not pose an adverse risk to human health.

Environmental Assessment

TCE (76 µg/L) and PCE (1.83 µg/L) in soil gas exceeded WQSA thresholds (1.8 µg/L [VLEACH2] for TCE and PCE at 50 to 60 feet bgs). Accordingly, soil contamination at F-4 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for F-4 are listed below.

COC (concentration)	RAO Source	RAO
TCE (76 µg/L)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
PCE (1.83 µg/L)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE and PCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at F-4.

Selected Remedy

The FS evaluated remedial alternatives to address VOCs in soil gas exceeding WQSA thresholds. The selected remedial alternative for F-4 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. SVE system design, including data gathering via a small scale SVE system, is currently being performed at F-4 in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000b) approved by the BCT. Completion of a site-specific START analysis will determine if SVE must be continued or can be terminated. Implementation of the selected remedy will reduce concentrations of TCE and PCE to levels that no longer pose an adverse risk to groundwater quality.

2.8.1.9 Sewer Segment 2

Site Description

The Castle Airport Sanitary Sewer Group (SSG) is composed of approximately 90,500 feet in total length of sanitary sewer piping that is buried approximately 6 to 8 feet bgs and divided into nine sections. Sewer Segment 2 (SS-2) is the segment located near the intersection of "A" and SAC Streets in the vicinity of B1234 in grid Q,10 (Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-9). The major part of the system was installed in 1941 during construction of CAFB. Initially, all industrial facilities were served by the SSG and large amounts of industrial wastes from sumps, OWSs, floor drains and washracks were disposed through the system. Currently, only sanitary sewage is collected and routed to the Base Sewage Treatment Plant.

The soil at SS-2 consists of stratified sand and silt extending from approximately 10 feet bgs to groundwater (approximately 70 feet bgs). The COPCs were solvents, fuels and oils. Damaged and leaking joints/sections of the pipeline were potential sources of contamination.

Site Characterization

A previous soil gas survey found TCE contamination (14 μg/L) in the vicinity of the SSG near the intersection of "A" Street and 4th Avenue. Three video surveys (two in 1991 and one in 1994) have been conducted on the SSG lines. All surveys identified root intrusion and significant damage to portions of the SSG near SS-2. The damage ranged from slight cracks to structural deterioration and misaligned joints.

During the Phase 1 SCOU RI, soil and soil gas samples were collected at regularly spaced intervals along SS-2 but, due to power lines directly over the sanitary sewer line, soil boring locations were moved approximately 20 feet away from SS-2. During the Phase 2 RI, additional soil samples were collected closer to SS-2 using hand augers to confirm suspected source areas. Soil and soil gas sampling locations for the SS-2 site during the SCOU RI are provided in Appendix E (Figure E-9). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SS-2 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
9	0	19	8

SS-2 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC

SS-2 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	Naphthalene	0.013	15.5-16	mg/kg
	1,2-Dichloroethane	0.012	0	mg/kg
Petroleum Hydrocarbons	Gasoline	9.8	15.5-16	mg/kg
	Diesel	63	15.5-16	mg/kg
Metals	Cadmium	0.61 (0.5)	9-10	mg/kg
Soil Gas Results				
VOCs	TCE	6.4	20	µg/L
Note * Corresponding TBVs are listed in parentheses.				

Chlorinated VOCs were detected in soil gas samples to a depth of approximately 30 feet bgs. VOCs, petroleum hydrocarbons and metals (>TBVs) were detected in soil samples to respective depths of 15, 15 and 10 feet bgs. The single metal (cadmium) exceeding TBVs was not considered to be anthropogenic because it was detected in a single sample and did not exceed the maximum TBV for cadmium (0.91 mg/kg). The estimated extent of chlorinated VOC contamination in soil gas and petroleum hydrocarbon contamination in soil at SS-2 is shown in Appendix E (Figure E-9).

After the Phase 2 RI, the BCT decided that site SS-2 was not sufficiently characterized to support selection of an appropriate remedy and that contamination by chlorinated VOCs and petroleum hydrocarbons required further characterization. Additional soil samples were analyzed for VOCs, and

TEPH, and soil gas samples were analyzed for VOCs during the Data Gap Investigation. The sampling and analysis was performed in accordance with the SCOU Data Gap Field Sampling Plans approved by the BCT. TEPH was detected in soil at a maximum concentration of 8 mg/kg; no VOCs were detected in the soil samples. TCE was detected in soil gas at a maximum concentration of 54.1 μg/L, and cis-1,2-DCE was detected in soil gas at a maximum concentration of 8.4 μg/L. The TCE concentrations increased with depth and were most likely due to volatilization from the Main Base groundwater plume. A summary of the number and types of samples, analyses, and maximum detections during the Data Gap Investigation is presented below.

SS-2 Data Gap Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
2	0	5	7

SS-2 Data Gap Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Soil Gas Analyses	
VOCs	TO-14

SS-2 Data Gap Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,4-dichlorobenzene	0.023	23	µg/L
	Freon 113	0.012	41	µg/L
	1,2,4-trimethylbenzene	0.144	64.5	µg/L
	1,3,5-trimethylbenzene	0.050	23	µg/L
	4-ethyltoluene	0.149	23	µg/L
	Acetone	0.479	41.5	µg/L
	Benzene	0.678	23	µg/L
	Carbon disulfide	0.041	41.5	µg/L
	Chloroform	0.143	64.5	µg/L
	cis-1,2-DCE	8.417	64.5	µg/L
	Dichlorodifluoromethane	0.005	41.5	µg/L
	Ethylbenzene	0.123	23	µg/L
	2-butanone (MEK)	0.207	41.5	µg/L
	Methylene chloride	0.063	64.5	µg/L
	n-hexane	1.211	23	µg/L
	NMOC	157	64.5	µg/L
	Styrene	0.011	23	µg/L
	PCE	0.199	63.5	µg/L
	Toluene	0.338	41.5	µg/L
	TCE	54.13	64.5	µg/L
	Freon 11	0.01	41	µg/L
	Xylenes	0.526	23	µg/L
Soil Results				
VOCs	TEPH	8.0	20.5	mg/kg

A complete presentation of RI activities and results for the SSG site (including SS-2) are provided in Section 7.1.3 of the *SCOU RI/FS* (JEG, 1997a). A complete discussion of activities and results for the Data Gap Investigation at the SS-2 site is found in Section 5.6 of the *SCOU Data Gap Investigation Report* (JEG, 1999).

Human Health Risk Assessment

The maximum cumulative residential risk was 1×10^{-7} and the non-cancer hazard index was 0.003. Based on these results, SS-2 does not pose an adverse risk to human health.

Environmental Assessment

TCE (54 µg/L) and cis-1,2-DCE (8.42 µg/L) in soil gas exceeded WQSA thresholds (1.8 µg/L [VLEACH2] for TCE at 50 to 60 feet bgs; 1.8 µg/L [VLEACH2] for cis-1,2-DCE at 50 to 60 feet bgs). Accordingly, soil contamination at SS-2 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for SS-2 are listed below.

COC (concentration)	RAO Source	RAO
TCE (54 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (8.42 µg/L, soil gas)	STOP	VLEACH2 - 1.8 µg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE and cis-1,2-DCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SS-2.

Selected Remedy

The *Data Gap Investigation Report* evaluated remedial alternatives addressing VOCs in excess of WQSA thresholds. The selected remedial alternative for SS-2 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. SVE system design, including data gathering via a small scale SVE system, is currently being performed at SS-2 in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000b) approved by the BCT. Completion of a site-specific START analysis will determine if SVE must be continued or can be terminated. Implementation of the selected remedy will reduce concentrations of TCE and cis-1,2-DCE to levels that no longer pose an adverse risk to groundwater quality.

2.8.1.10 Sewer Segment 4

Site Description

Sewer Segment 4 (SS-4) is a part of the SSG located near B1253 and underground fuel leak 2 (UFL-2) that was indicated as damaged by the video survey performed during the SCOU RI. A site map is provided in Appendix E (Figure E-1).

Site Characterization

A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SS-4 RI Sampling Summary			
Soil Borings	Soil Gas Probes	Soil Samples	Soil Gas Samples
7	0	22	19

SS-4 RI Analysis Summary	
Contaminant Category	Analytical Method
VOCs	TO-14
TEPH	CA8015/TVPH & TEPH
TVPH	CA8015/TVPH & TEPH
metals	SW6010
SVOCs	SW8270

SS-4 RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
Petroleum Hydrocarbons	TEPH	58	35	mg/kg
	TVPH	20	35	mg/kg
VOCs	Napthalene	11	5	µg/kg
	TCE	1.6	20	µg/kg
	xylenes	54.8	5	mg/kg
Soil Gas Results				
Petroleum Hydrocarbons	TVPH	0.027	5	µg/L
VOCs	TCE	13.2	20	µg/L

TVPH (at a maximum of 58 mg/kg) and PAHs (at a maximum concentration of 11 mg/kg for naphthalene) were detected in soil at 35 feet bgs and 5 feet bgs, respectively. Xylenes (at a maximum of 54.8 mg/kg) were detected in soil at 5 feet bgs, and TCE was detected up to 13.2 µg/L at 20 feet bgs in soil gas.

After the Phase 2 RI, the BCT decided that site SS-4 was not sufficiently characterized to support selection of an appropriate remedy and that contamination by chlorinated VOCs and petroleum hydrocarbons required further characterization. Additional soil gas samples were analyzed for VOCs during the Data Gap Investigation. The sampling and analysis was performed in accordance with the SCOU Data Gap Field Sampling Plans approved by the BCT. TCE was reported at a maximum concentration of 42.8 µg/L. Carbon tetrachloride, 1,1-DCE, and PCE were also reported during the Data Gap Investigation. A summary of the number and types of samples, analyses, and maximum detections during the Data Gap Investigation is presented below.

SS-4 Data Gap Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
2	0	0	6

SS-4 Data Gap Analysis Summary	
Contaminant Category	**Analytical Method**
VOCs	TO-14

SS-4 Data Gap Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,1-DCE	4.4	60	µg/L
	1,2,4-Trimethylbenzene	0.026	59.5	µg/L
	1,3,5-Trimethylbenzene (mesitylene)	0.009	59.5	µg/L
	4-Ethyltoluene	0.023	59.5	µg/L
	Acetone	0.108	59.5	µg/L
	Benzene	0.039	20	µg/L
	cis-1,2-DCE	0.180	40	µg/L
	Carbon disulfide	0.004	59.5	µg/L
	Carbon tetrachloride	1.464	60	µg/L
	Chloroform	0.541	40	µg/L
	Ethylbenzene	0.022	59.5	µg/L
	2-butanone (MEK)	0.034	59.5	µg/L
	Methylene chloride	0.162	40	µg/L
	n-Hexane	0.075	59.5	µg/L
	NMOC	125	40	µg/L
	Styrene	0.009	59.5	µg/L
	PCE	17.131	40	µg/L
	TCE	42.8	40	µg/L
	Toluene	0.110	59.5	µg/L
	Freon 11	0.002	59.5	µg/L
	Xylenes	0.092	59.5	µg/L

Additional soil gas characterization was performed under the SVE Decision Study. The SVE Decision Study at SS-4 included the installation of 1 triple-completion vapor well, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. The 3 screens of the vapor well were sampled and analyzed for TCE with a field GC. The screen with the highest TCE reading was sampled in a SUMMA canister and analyzed at a laboratory for VOCs.

TCE and PCE were detected at maximum concentrations of 37 µg/L and 13 µg/L, respectively (Earth Tech, 2000b). The results of the SVE Decision Study confirmed that the VOC plume at SS-4 is contiguous with the B51 Group VOC plume. A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

SS4 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
1	3	3	1

SS4 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

SS4 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,1-DCE	2.86	50-60	µg/L
	carbon tetrachloride	1.20	50-60	µg/L
	chloroform	0.37	50-60	µg/L
	cis-1,2-DCE	0.13	50-60	µg/L
	PCE	12.88	50-60	µg/L
	toluene	0.13	50-60	µg/L
	TCE	36.52	50-60	µg/L

Human Health Risk Assessment

The maximum cumulative residential risk was 2×10^{-8} and the non-cancer hazard index was 0.0003. Based on these results, SS-4 does not pose an adverse risk to human health.

Environmental Assessment

TCE (42.8 μg/L at 40 feet bgs and 37 μg/L at 50 to 60 feet bgs), PCE (17.1 μg/L at 40 feet bgs and 13 μg/L at 50 to 60 feet bgs), and 1,1-DCE (4.4 μg/L) exceeded WQSA thresholds (6.9 μg/L [VLEACH2] for TCE at 30 to 40 feet bgs; 1.8 μg/L [VLEACH2] for TCE at 50 to 60 feet bgs; 6.9 μg/L [VLEACH2] for PCE at 30 to 40 feet bgs; 1.8 μg/L [VLEACH2] for PCE at 50 to 60 feet bgs; 0.1 [VLEACH2] for 1,1-DCE at 50 to 60 feet bgs). Accordingly, soil contamination at SS-4 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for SS-4 are listed below.

COC (concentration)	RAO Source	RAO
TCE (42.8 μg/L, soil gas)	STOP	VLEACH2 - 6.9 μg/L, 30 to 40 feet bgs or lowest level technically and economically achievable
TCE (37 μg/L, soil gas)	STOP	VLEACH2 - 1.8 μg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
PCE (17.1 μg/L, soil gas)	STOP	VLEACH2 – 6.9 μg/L, 30 to 40 feet bgs or lowest level technically and economically achievable
PCE (13 μg/L, soil gas)	STOP	VLEACH2 - 1.8 μg/L, 50 to 60 feet bgs or lowest level technically and economically achievable
1,1-DCE (4.4 μg/L, soil gas)	STOP	VLEACH2 – 0.1 μg/L, 50 to 60 feet bgs or lowest level technically and economically achievable

TCE, PCE, and 1,1-DCE in soil gas represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SS-4.

Selected Remedy

The *Data Gap Investigation Report* evaluated remedial alternatives addressing VOCs in soil gas in excess of WQSA thresholds. The selected remedial alternative for SS-4 is SVE as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of TCE, PCE, and 1,1-DCE to levels that no longer pose an adverse risk to groundwater quality. The *SVE Decision Study* determined that the contamination at SS-4 was contiguous with the Building 51 VOC plume (Earth Tech, 2000a). Thus, remediation at SS-4 is being conducted as a component of the Building 51 Group. Implementation of SVE at the B51 Group was initiated in August 2001 as a removal action. The *Action Memorandum* (MWH, 2001a) and *Design Report* (MWH, 2001b) were reviewed and approved by the BCT.

2.8.2 WASTE OIL TANK AND OWS SITE SUMMARIES

The waste oil tank and OWS sites included in the SCOU ROD Part 2 are listed below. Site summaries representing pertinent information from the *SCOU RI/FS* are provided in the following sections. Each of the waste oil tank and OWS sites is a SWMU that was identified by DTSC in the RCRA Facility Assessment (RFA) (DTSC, 1990). In order to avoid duplication and confusion between the RCRA and CERCLA programs, the BCT agreed to include the SWMUs as CERCLA sites in the SCOU RODs. In accordance with the Castle AFB Interagency Agreement (USAF, 1989), Section 17, Statutory Compliance/RCRA-CERCLA Integration, any remedial action selected under the agreement shall obviate the need for further corrective action under RCRA. Twenty-three of the thirty-eight SWMUs identified at Castle Airport were included in the SCOU ROD Part 1. The remaining fifteen SWMUs are addressed in the SCOU ROD Part 2; six are included in this section as waste oil tank and OWS sites and nine are included in Section 2.8.3 as NFA sites.

The SWMUs are included in this ROD to memorialize the remedy and document the RAOs applicable to each site for the protection of human health and groundwater quality. Consistent with the derivation of HHRA RAOs for Castle Airport, the HHRA results provided for each site are for the residential scenario without the produce pathway. Additionally, the HHRA results represent baseline conditions prior to any excavation performed under the CAFB tank and OWS program.

Waste Oil Tank and OWS Sites (6 Sites)			
SWMU 4.3	SWMU 4.6	SWMU 4.21	
SWMU 4.4	SWMU 4.16	SWMU 4.22	

2.8.2.1 SWMU 4.3

Site Description

SWMU 4.3 included one 8,000-gallon AST and one 10,000-gallon AST used to store waste oil received from an OWS (SWMU 4.21) at B1521 within DA-5, (Section 2.8.1.7). A site map is provided in Appendix E (Figure E-7). The tanks were located at the south corner of the aircraft operational apron immediately south of the OWS, on the west side of Building 1521. The ASTs were set in an earthen bermed area lined with plastic and overlaid with asphalt pavement. The ASTs were removed in July 1996 in accordance with CCR Title 23 requirements (Laguna, 1997).

Site Characterization

Three soil borings were hand-augered to a depth of 4 feet bgs adjacent to B1521 during the SCOU RI and analyzed for TEPH, TVPH, and VOCs. TEPH was detected at a maximum concentration of 26,000 mg/kg and TVPH was detected at a maximum concentration of 900 mg/kg. A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.3 SCOU RI Sampling Summary			
Soil Borings	Soil Gas Probes	Soil Samples	Soil Gas Samples
3	0	3	0

SWMU 4.3 SCOU RI Analysis Summary	
Contaminant Category	Analytical Method
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010

SWMU 4.3 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	TEPH	26,000	2.5	mg/kg
	TVPH	900	4.0	mg/kg
	napthalene	37	2.5	mg/kg
	xylenes	24.1	2.5	mg/kg
Metals	lead	106 (7.4)	0.5	mg/kg
	cadmium	1.1 (0.5)	0	mg/kg
	silver	0.49	0.5	mg/kg

Four soil borings and one vapor monitoring well were completed at B1521 during the Data Gap Investigation at DA-5. Soil samples were collected and analyzed for TEPH, TVPH, and VOCs, and soil gas samples were collected and analyzed for VOCs. TEPH was detected in soil at a maximum concentration of 48 mg/kg. A summary of the number and types of samples, analyses, and maximum detections during the Data Gap Investigation is presented below.

SWMU 4.3 Data Gap Sampling Summary			
Soil Borings	**Soil Vapor Wells**	**Soil Samples**	**Soil Gas Samples**
3	1	10	1

SWMU 4.3 Data Gap Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010

SWMU 4.3 Data Gap Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	TEPH	48	0.5	mg/kg
Metals	lead	13.2	0.5	mg/kg
	Silver	2	4.5	mg/kg
	Zinc	24.9	4.5	mg/kg
Soil Gas Results				
VOCs	1,2,4-Trimethylbenzene	18.38	23	µg/L
	1,2,4-Trichlorobenzene	0.06	41.5	µg/L
	1,3,5-Trimethylbenzene	2.14	21.5	µg/L
	4-ethyltoluene	19.8	23	µg/L
	Benzene	0.052	11.5	µg/L
	ethylbenzene	3.3	23	µg/L
	PCE	0.66	55.5	µg/L
	TCE	0.195	41.5	µg/L
	Xylenes	6.57	21.5	µg/L
	cis-1,2-DCE	1.0	39	µg/L
	toluene	0.13	11.5	µg/L
	Carbon disulfide	0.007	55.5	µg/L
	chloroform	0.005	55.5	µg/L
	Freon 11	0.003	55.5	µg/L
	Methylene chloride	0.24	23	µg/L
	acetone	0.72	23	µg/L
	4-methyl-2-pentanone	0.031	10.5	µg/L
	2-butanone (MEK)	0.19	10.5	µg/L
	styrene	0.006	10.5	µg/L

Based on data from the SCOU RI and SCOU Data Gap Investigation, the AST saddles and earthen berm were removed, and soil directly beneath the earthen berm was excavated in 1999 (GRC, 2001). The excavation encompassed the locations of the SCOU RI hand-augered borings. The initial excavation was approximately 500 cubic yards and no contamination was apparent at the base of the excavation (11.5 feet bgs). However, contamination was noted in the sidewalls of the excavation, and an additional 75 cubic yards were removed via 3 trenches: one to the north, one to the south, and one to the west.

Soil samples were collected from all three trenches, the floor of the primary excavation, and from the east wall of the primary excavation directly beneath B1521. No reduction in soil concentrations in the north trench and east wall samples was noted. Soil sample results indicated TEPH concentrations up to 18,000 mg/kg. Other detected compounds included naphthalene (33 mg/kg) and 2-methylnapthalene (290 mg/kg) (GRC, 2001).

In March 2002, two trenches were excavated adjacent to B1521 to further delineate the extent of contamination (MWH, 2002b). One trench was completed to the southeast of B1521 to depths ranging from 5 to 14 feet bgs. Four soil samples were collected and analyzed for TEPH and TVPH. TEPH was detected at a maximum concentration of 15 mg/kg and TVPH at 0.97 mg/kg (MWH, 2002b). The second trench was excavated to the northeast of B1521 to a maximum depth of 5 feet bgs. Two soil samples were collected and analyzed for TEPH and TVPH. TEPH was detected at a maximum concentration of 16.4 mg/kg and TVPH at 0.08 mg/kg (MWH, 2002b).

Human Health Risk Assessment

The HHRA performed for DA-5 included SWMU 4.3. The maximum cumulative residential risk is 6×10^{-7} for surface soil and 1×10^{-6} for subsurface soil. The surface soil value reflects an adjustment from the surface soil value reported for DA-5 in Appendix C. Review of Appendix C concluded that the cancer risk for DA-5 was calculated using a different Henry's constant for methylene chloride than was used to calculate the risk-based RAO for methylene chloride. Risk for DA-5 was reported in the HHRA update to be 3×10^{-6} for surface soil. When the same Henry's constant that was used to calculate the RAO is used to calculate the DA-5 risk, the maximum cumulative residential risk is 6×10^{-7} for surface soil and 1×10^{-6} for subsurface soil. The non-cancer hazard index is 0.18 for surface soil and 0.02 for subsurface soil. Based on these results, SWMU 4.3 does not pose an adverse risk to human health.

Environmental Assessment

TVPH (900 mg/kg) and TEPH (26,000 mg/kg) in soil exceeded WQSA thresholds (100 mg/kg for TVPH in soil at 0 to 20 feet bgs; 1,500 mg/kg for TEPH in soil at 0 to 20 feet bgs). Accordingly, soil contamination at SWMU 4.3 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the results of the SCOU RI and Data Gap Investigation, site COCs and RAOs for SWMU 4.3 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (900 mg/kg, soil)	DLM	100 mg/kg, 0 to 20 feet bgs
TEPH (26,000 mg/kg, soil)	DLM	1,500 mg/kg, 0 to 20 feet bgs

TVPH and TEPH in soil represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SWMU 4.3.

Selected Remedy

The selected remedial alternative for SWMU 4.3 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. In addition, bioventing has been added to the remedy to address site contamination that will remain under concrete-encased utility lines within the site that cannot be cost-effectively removed by excavation or re-routing of the utility lines. The CERCLA basis for adding bioventing to the selected remedy is that bioventing had been identified in the SCOU FS and the SCOU *Revised Proposed Plan* as a component of the preferred alternative at DA-5, expressly to address residual hydrocarbon contamination at SWMUs 4.3 and 4.21 within the DA-5 site. Implementation of the selected remedy will reduce concentrations of TVPH and TEPH to levels that no longer present an adverse risk to groundwater quality.

2.8.2.2 SWMU 4.4

Site Description

SWMU 4.4 was an OWS that served Building 59 (grid S,12, Plate 1, Appendix A), a vehicle refueling and maintenance facility located in the petroleum, oils, and lubricants (POLs) fuel farm area (PFFA) at the south end of the MBS. A site map is provided in Appendix E (Figure E-10). The OWS consisted of an unlined concrete vault with a capacity of 100 gallons. The PFFA served as the bulk fuel storage and distribution facility for CAFB. The PFFA was included in SCOU ROD 1 as a petroleum hydrocarbon only site; however, SWMU 4.4 was delayed until this ROD due to the potential presence of SVOCs and metals. The primary COPCs at SWMU 4.4 were oils, fuels and soap associated with PFFA operations.

The OWS was a possible source of contamination through cracks in the concrete vault and leaks in the underground pipelines.

Site Characterization

A soil boring (PFFASB11) was drilled and sampled at SWMU 4.4 during RI activities at the PFFA. Soil samples were analyzed for VOCs, SVOCs, TVPH, TEPH, and metals, and soil gas samples were analyzed for VOCs. Detected VOCs in soil include 1,4-dichlorobenzene (maximum concentration of 0.43 μg/kg at 16.5 feet bgs) and methylene chloride (maximum concentration of 4.3 μg/kg at 5.5 feet bgs); however, 1,4-dichlorobenzene and methylene chloride were also detected in the laboratory blank and subsequently qualified as laboratory contamination. Soil gas detections included toluene (up to 1.1 μg/L) and xylenes (up to 0.043 μg/L). The SCOU RI/FS identified a data gap for potential contaminants beneath the OWS. A complete presentation of RI activities and results for SWMU 4.4 is provided in Section 7.2.1 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.4 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
1	0	2	1

SWMU 4.4 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	E18

SWMU 4.4 SCOU RI Maximum Detections				
Contaminant Category	Contaminant of Potential Concern	Maximum Concentration	Depth (feet bgs)	Units
Soil Gas Results				
VOCs	Toluene	1.1	21.5	µg/L
	Xylenes	0.043	21.5	µg/L

No target analytes (or metals >TBVs) were detected in the soil samples to a maximum depth of approximately 16.5 feet bgs. Aromatic VOCs were detected in the soil gas sample at a depth of approximately 21.5 feet bgs. A data gap was identified for SVOCs underneath the OWS.

The OWS was removed in 1996 (Laguna, 1997). Removal included excavation of asphalt pavement and soil surrounding the OWS, and removal and demolition of the concrete vault. The excavation depth was 6.5 feet bgs, and stained soil was observed on the northwest and southwest sides of the excavation upon removal of the OWS. However, further excavation was considered infeasible due to the proximity of Building 59. The influent and effluent lines were capped and left in place, and the excavation was backfilled with clean fill. A soil sample was collected from the northwest excavation sidewall upon removal of the OWS and analyzed for TEPH, TVPH, VOCs, and metals (Laguna, 1997). The following compounds were detected: TEPH (2,200 mg/kg), TVPH (2,000 mg/kg), xylenes (51 mg/kg), 1,2,4-trimethylbenzene (34 mg/kg), and 1,3,5-trimethlybenzene (15 mg/kg).

Human Health Risk Assessment

The HHRA performed for the PFFA included SWMU 4.4. The maximum cumulative residential risk for the PFFA was 2 x 10^{-6} and the non-cancer hazard index was 0.01. The risk was primarily due to PAHs. However, since no contaminants were detected at SWMU 4.4 in excess of HHRA RAOs, SWMU 4.4 did not contribute to adverse human health risk at the PFFA.

Environmental Assessment

TVPH (2,000 mg/kg) and TEPH (2,200 mg/kg) in soil exceeded WQSA thresholds (100 mg/kg for TVPH in soil at 0 to 20 feet bgs; 1,500 mg/kg for TEPH in soil at 0 to 20 feet bgs). Accordingly, soil contamination at SWMU 4.4 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the results of sampling performed during removal of the OWS, site COCs and RAOs for SWMU 4.4 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (2,000 mg/kg, soil)	DLM	100 mg/kg, 0 to 20 feet bgs
TEPH (2,200 mg/kg, soil)	DLM	1,500 mg/kg, 0 to 20 feet bgs

TVPH and TEPH in soil represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SWMU 4.4.

Selected Remedy

The selected remedial alternative for SWMU 4.4 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of TVPH and TEPH to levels that no longer present an adverse risk to groundwater quality.

2.8.2.3 SWMU 4.6

Site Description

SWMU 4.6, consisting of two in-ground OWSs, is located at the Motor Pool maintenance building (B88) in grid S,12 of Plate 1. A site map is provided in Appendix E (Figure E-11). The first OWS was located near a former washrack northeast of B88, and was constructed of concrete with a reported capacity of 300 gallons. Although not documented, it is assumed that there was no liner, secondary containment, or leak detection system. Influent was from the former washrack, and a short effluent line led to a nearby sewer lateral. Materials potentially discharged to the OWS include motor oil, grease, gasoline, and hydraulic fluid (JEG, 1997a). The OWS was removed in 1996 (Laguna, 1997). Removal included excavation of overburden soil and surrounding asphalt and concrete, and removal and demolition of the vault. The base of the OWS was at approximately 4 feet bgs, and hardpan was encountered at 6 feet bgs (bottom of excavation). The OWS was described as being in good condition with no evidence of cracking or corrosion. Stained soil with a slight odor and a photoionization detector (PID) reading of 1.1 parts per million (ppm) was observed in the excavation directly under the influent pipe. Following removal of the OWS, the influent and effluent lines were plugged with concrete, and the excavation was backfilled with 45 cubic feet of clean fill. The volume of contaminated soil removed was not documented.

The second OWS, which remains in place, is located at the northwest corner of B88. Influent is from floor drains in B88. Since B88 was used for vehicle maintenance, likely contaminants include fuels, oils, hydraulic fluid, and solvents. According to the RFA (DTSC, 1990), record reviews indicate that the facility also used a paint stripper containing methylene chloride and phenols. The capacity of the OWS is estimated to be 220 gallons based upon its dimensions. It is a baffle/weir design with no secondary containment or leak detection.

Site Characterization

One surface and one subsurface soil sample (3.5 feet bgs) were collected during the SCOU RI and analyzed for VOCs, SVOCs, TEPH, and TVPH. Methylene chloride was the only contaminant detected; however, it was also detected in the laboratory blank and subsequently qualified as laboratory contamination. The SCOU RI/FS identified a data gap at SWMU 4.6 for potential contaminants beneath the OWS. A complete presentation of RI activities and results for SWMU 4.6 is provided in Section 7.2.40 of the *SCOU RI/FS* (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.6 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
1	0	2	0

SWMU 4.6 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH

SWMU 4.6 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	Methylene Chloride	5.6	0	µg/kg

A soil sample was collected from the bottom of the excavation (6.8 feet bgs) after removal of the first OWS and analyzed for TEPH, TVPH, VOCs, and metals (Laguna, 1997). TEPH was detected at a concentration of 51 mg/kg. Three soil borings were advanced in 1999 (GRC, 2001) along the sidewalls of the former excavation. Soil samples were collected at depths of 7 and 8 feet bgs and analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. No detections of TEPH, TVPH, VOCs, or SVOCs were reported, and metals were below RAOs; however, the borings may have been drilled in an incorrect location and may not be applicable. An additional sample was collected from a depth of 6.4 feet bgs beneath the location of the former OWS (JEG, 2000) and analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. TEPH was detected at 48 mg/kg, and several metals exceeded TBVs.

Human Health Risk Assessment

The maximum cumulative residential risk was 2 x 10^{-8} and the non-cancer hazard index was 0.00002. The calculated risk and hazard quotient were due solely to the detection of methylene chloride; however, methylene chloride was determined to be a laboratory contaminant due to its presence in the laboratory blank. Based on these results, SWMU 4.6 does not pose an adverse risk to human health.

Environmental Assessment

No contaminants were detected in excess of WQSA thresholds; therefore, SWMU 4.6 does not pose an adverse threat to groundwater quality.

Site COCs and RAOs

No known contamination is present at SWMU 4.6 at concentrations posing an adverse risk to human health or groundwater quality. However, confirmation sampling results must address the data gap identified under the OWS and must achieve Castle Airport RAOs described in Section 2.7.

Selected Remedy

The selected remedial alternative for SWMU 4.6 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. The selected remedy is based upon a potential release under the OWS. Implementation of the selected remedy will eliminate this potential and the potential for future releases.

2.8.2.4 SWMU 4.16

Site Description

SWMU 4.16 is located at B956 in grid S,13 (Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-12). SWMU 4.16 consisted of a 5-foot square, 8-foot deep OWS with a capacity of approximately 1,500 gallons. The inside surfaces of the separator were coated with a corrosion-resistant paint. Seams and joints were sealed with rubber and neoprene. There was no secondary containment or leak detection system associated with the separator. The OWS was removed in 1996 (Laguna, 1997). The COPCs were oil, fuel, hydraulic fluids and solvents that may have leaked from cracks in the separator vault.

Site Characterization

During the SCOU RI, soil samples were analyzed for TEPH, TVPH, VOCs, and SVOCs, and metals, and soil gas samples were analyzed for VOCs. Compounds detected in soil, and their maximum concentrations include xylenes (0.005 mg/kg), p-isopropyl toluene (0.021 mg/kg), naphthalene (0.016 mg/kg), and 1,2,4-trimethylbenzene (0.007 mg/kg), and TEPH (3.5 mg/kg). Soil gas detections included benzene (7.9 μg/L), toluene (13.5 μg/L), ethylbenzene (21.1 μg/L), and xylenes (57 μg/L). The maximum depth of detections in soil and soil gas was 20 feet bgs. The SCOU RI/FS identified a data gap at SWMU 4.16 for potential contaminants beneath the OWS. A complete presentation of RI activities/results for SWMU 4.16 is provided in Section 7.2.41 of the *SCOU RI/FS* (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.16 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
3	0	7	3

SWMU 4.16 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC

SWMU 4.16 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	Xylenes	0.005	19.5	mg/kg
	p-Isopropyl toluene	0.021	14.5	mg/kg
	Naphthalene	0.016	14.5	mg/kg
	1,2,4-Trimethylbenzene	0.007	14.5	mg/kg
Petroleum Hydrocarbons	TEPH	3.5	10.5-11	mg/kg
Soil Gas Results				
VOCs	Benzene	7.9	10	µg/L
	Toluene	13.5	20	µg/L
	Ethylbenzene	21.1	20	µg/L
	Xylenes	57	10	µg/L

A soil sample was collected from the base of the excavation (11.5 feet bgs) during removal of the OWS and analyzed for TEPH, TVPH, metals, and VOCs (Laguna, 1997). The following detections were reported: TEPH (23 mg/kg), TVPH (0.420 mg/kg), p-isopropyltoluene (7.8 µg/kg), 1,2,3,4-

tetramethylbenzene (8.5 μg/kg). All detected metals were below RAOs. Two soil borings were advanced in 1999 and samples were collected at depths of 5 and 12 feet bgs (GRC, 1999). The samples were analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. No TEPH, TVPH, VOCs, or SVOCs were detected, and metals were below RAOs. However, the lateral and vertical extent of contamination in the vicinity of the backflow valve was not adequately characterized.

Four soil borings were advanced in November 2002 (JEG, in progress) to evaluate excavation sidewall contamination, potential releases from OWS influent and effluent lines, and staining and odor noted in the area of the backflow valve north of the excavation. Soil samples were analyzed for TEPH, TVPH, BTEX, SVOCs, and metals. A sample collected from a depth of 14.75 had a TEPH concentration of 9,650 mg/kg. No other contaminants were detected in excess of RAOs (JEG, in progress).

Human Health Risk Assessment

No contaminants were detected in excess of HHRA RAOs; therefore, SWMU 4.16 does not pose an adverse threat to human health.

Environmental Assessment

TEPH (9,650 mg/kg) in soil exceeded the WQSA threshold (1,500 mg/kg for TEPH in soil at 0 to 20 feet bgs). Accordingly, soil contamination at SWMU 4.16 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the results of November 2002 sampling, site COCs and RAOs for SWMU 4.16 are listed below.

COC (concentration)	RAO Source	RAO
TEPH (9,650 mg/kg, soil)	DLM	1,500 mg/kg, 0 to 20 feet bgs

TEPH in soil represents adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SWMU 4.16.

Selected Remedy

The selected remedial alternative for SWMU 4.16 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. Implementation of the selected remedy will reduce concentrations of TEPH to levels that no longer present an adverse risk to groundwater quality.

2.8.2.5 SWMU 4.21

Site Description

SWMU 4.21 was an OWS associated with Discharge Area 5 described in Section 2.8.1.7. A site map is provided in Appendix E (Figure E-7). Contaminated water containing detergents and solvents flowed directly from the washrack to the OWSs. Waste oil from the OWSs was stored in the AST. On certain occasions, the separators were reportedly bypassed, allowing contaminants to flow directly into the drainage ditch. The washrack and OWSs were in operation from the 1950s until base closure in 1995.

Site Characterization

SWMU 4.21 was investigated during the SCOU RI as a component of DA-5 described in Section 2.8.1.7. A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.21 RI Sampling Summary			
Soil Borings	Soil Gas Probes	Soil Samples	Soil Gas Samples
6	0	26	14

SWMU 4.21 RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
TEPH & TVPH	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	E18

SWMU 4.21 RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
Petroleum Hydrocarbons	TEPH	81	4	mg/kg
VOCs	1,4-dichlorobenzene	0.58	14	µg/kg
	cis-1,2-DCE	7.3	19	µg/kg
Metals	Ag	0.99	24	mg/kg
	Ni	33.1	49	mg/kg
	Pb	9.1	49	mg/kg
	Zn	119	49	mg/kg
Soil Gas Results				
VOCs	TCE	0.8	69	µg/L

The SCOU RI/FS identified a data gap at SWMU 4.21 for potential contaminants beneath the OWS. Pursuant to the identified data gap, 3 soil borings were advanced at SWMU 4.21 in 1999 (GRC, 1999). Soil samples were collected to a maximum depth of 13.5 feet bgs and analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. TEPH was detected up to 8,100 mg/kg, and TVPH was detected up to 1,800 mg/kg. No VOCs or SVOCs were detected, and metals were below RAOs. An exploratory trench was completed and sampled in 2002 (MWH, 2002b) to further characterize the extent of the TEPH and TVPH. Samples were collected at depths of 10 and 13.5 feet bgs, and TEPH was detected up to 3,910 mg/kg, and TVPH was detected up to 166 mg/kg.

Human Health Risk Assessment

The HHRA performed for DA-5 included SWMU 4.21. The maximum cumulative residential risk is 6 x 10^{-7} for surface soil and 1 x 10^{-6} for subsurface soil. The surface soil value reflects an adjustment from the surface soil value reported for DA-5 in Appendix C. Review of Appendix C concluded that the cancer risk for DA-5 was calculated using a different Henry's constant for methylene chloride than was used to calculate the risk-based RAO for methylene chloride. Risk for DA-5 was reported in the HHRA update to be 3 x 10^{-6} for surface soil. When the same Henry's constant that was used to calculate the RAO is used to calculate the DA-5 risk, the maximum cumulative residential risk is 6 x 10^{-7} for surface soil and 1 x 10^{-6} for subsurface soil. The non-cancer hazard index is 0.18 for surface soil and 0.02 for subsurface soil. Based on these results, SWMU 4.21 does not pose an adverse risk to human health.

Environmental Assessment

TEPH (8,100 mg/kg) and TVPH (1,800 mg/kg) exceeded WQSA thresholds (100 mg/kg for TVPH in soil at 0 to 20 feet bgs; 1,500 mg/kg for TEPH in soil at 0 to 20 feet bgs). Accordingly, soil contamination at SWMU 4.21 poses a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the results of soil sampling conducted in 1999 (GRC, 1999) and 2002 (MWH, 2002b), site COCs and RAOs for SWMU 4.21 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (8,100 mg/kg, soil)	DLM	100 mg/kg, 0 to 20 feet bgs
TEPH (1,800 mg/kg, soil)	DLM	1,500 mg/kg, 0 to 20 feet bgs

TVPH and TEPH in soil represent adverse risk to groundwater quality. No COCs representing adverse risk to human health are present at SWMU 4.21.

Selected Remedy

The selected remedial alternative for SWMU 4.21 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. In addition, bioventing has been added to the remedy. The CERCLA basis for adding bioventing to the selected remedy is that bioventing had been identified in the SCOU FS and the SCOU *Revised Proposed Plan* as a component of the preferred alternative at DA-5, expressly to address residual hydrocarbon contamination at SWMUs 4.3 and 4.21 within the DA-5 site. Implementation of the selected remedy will reduce concentrations of TVPH and TEPH to levels that no longer present an adverse risk to groundwater quality.

2.8.2.6 SWMU 4.22

Site Description

SWMU 4.22 consisted of an in-ground OWS located at ST-1571 (grid R,14, Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-13). The OWS contained a concrete vault with a capacity of approximately 525 gallons. There were no liners, secondary containment, or leak detection system associated with the OWS. The primary COPCs were oils, grease, hydraulic fluid, paints, metals and solvents associated with ST-1571, a former wash rack facility. The OWS was a possible source of contamination through cracks in the concrete vault and leaks in the underground pipelines. The OWS was removed in 1996 (Laguna, 1997).

Site Characterization

During the SCOU RI, soil samples were analyzed for TEPH, TVPH, VOCs, and SVOCs, and metals, and soil gas samples were analyzed for VOCs. Methylene chloride was detected slightly above reporting limits; however, methylene chloride was also detected in the laboratory blank and subsequently qualified as laboratory contamination. No other VOCs were detected. No SVOCs, TEPH, or TVPH were detected, and metals were below RAOs. The SCOU RI/FS identified a data gap at SWMU 4.22 for potential contaminants beneath the OWS. A complete presentation of RI activities/results for the SWMU 4.22 site (associated with the ST-1571 site) is provided in Section 7.2.34 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.22 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
2	0	3	1

SWMU 4.22 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Metals	SW6010
Lead	SW7421
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Soil Gas Analyses	
VOCs	SGVOC

SWMU 4.22 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	Methylene Chloride	0.0059	20.5	mg/kg

Human Health Risk Assessment

The maximum residential cumulative risk was 9×10^{-9} and the maximum cumulative hazard quotient was 0.00001. The calculated risk and hazard quotient were due solely to the detection of methylene chloride; however, methylene chloride was determined to be a laboratory contaminant due to its presence in the laboratory blank. Based on these results, SWMU 4.22 does not pose an adverse risk to human health.

Environmental Assessment

WQSA thresholds for VOCs were not exceeded at SWMU 4.22. Thus, SWMU 4.22 does not pose an adverse threat to groundwater quality.

Site COCs and RAOs

No known contamination is present at SWMU 4.22 at concentrations posing an adverse risk to human health or groundwater quality. However, proposed confirmation sampling must achieve Castle Airport RAOs described in Section 2.7.

Selected Remedy

The selected remedial alternative for SWMU 4.22 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD.

2.8.3 NO FURTHER ACTION SITES

Based upon the results of confirmation sampling performed upon completion of site cleanups or during supplemental site investigations, 14 CERCLA SCOU sites have been determined to require NFA to protect human health and groundwater quality. The 14 sites are detailed below, including specific references to the appropriate closure reports or investigation summaries. Changes to preferred alternatives or selected remedies previously specified for each of the NFA sites are discussed in Section 2.14, Documentation of Significant Changes.

No Further Action Sites (14 Sites)			
Building 1532	SWMU 4.8	SWMU 4.18	PCB-4
Building 1541[1]	SWMU 4.14	SWMU 4.23[1]	PCB-5
SWMU 4.5	SWMU 4.15	SWMU 4.29	PCB-6
SWMU 4.7	SWMU 4.17		

[1] SWMU 4.23 is associated with Building 1541

2.8.3.1 Building 1532

Site Description

The Building 1532 (B1532) site is located in grid R,12 (Plate 1). A site map is provided in Appendix E (Figure E-14). It was part of the 93rd Field Maintenance Squadron shops and consisted of the nondestructive inspection and Precision Measurement Equipment Laboratory areas used from 1960 through 1982. The building also was used for X-ray photography. An OWS was identified southeast of B1532, and received effluent from B1532 via pipelines connected to a system of floor drains located near the southern wall of the building. Hazardous materials generated at this site were temporarily stored on a concrete pad at a 90-day hazardous waste accumulation point (SWMU 4.32). SWMU 4.32 was addressed in SCOU ROD Part 1 as a NFA site. A 1,000 gallon UST used for storing heating oil, located at the B1532 site, was removed in March 1996 in accordance with CCR Title 23 and with the approval of the RWQCB (Laguna, 1997).

Subsurface sediments beneath B1532 consist mainly of silty sand and interbedded silt to approximately 18 feet bgs. A relatively continuous sand layer is present at approximate depths of 15 feet to 22 feet bgs.

Sediments beneath 22 feet bgs are predominantly mixed silts and clays to depths of approximately 54 feet bgs. A laterally continuous sand layer is present 55 feet bgs to at least 70 feet bgs.

Materials handled on this site (and COPCs) were oil, TCE and mercury. Possible contamination sources were leaks in the floor drains, the underground pipeline to the OWS, the sanitary sewer line, cracks in the foundation at B1532 and the storage pad at SWMU 4.32.

Site Characterization

Soil samples were analyzed for VOCs, SVOCs, TVPH, TEPH, lead and mercury, and soil gas samples were analyzed for VOCs during the SCOU RI. During the SCOU RI, 1,1-DCE (up to 270 μg/L) and TCE (up to 43.3 μg/L) were detected in soil gas samples. 1,1-DCE was detected (up to 6.7 mg/kg) in three soil samples. A complete presentation of RI activities and results for B1532 is provided in Section 7.2.31 of the *SCOU RI/FS* (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

B1532 SCOU RI Sampling Summary				
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Groundwater (HydroPunch) Samples**	**Soil Gas Samples**
8	12	22	2	45

B1532 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil/Groundwater Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Lead	SW7421
Mercury	SW7471
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

B1532 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	1,1-DCE	6.7		mg/kg
Metals	Mercury	0.15 (0.10)	0	mg/kg
Soil Gas Results				
VOCs	1,1-DCE	270	10	µg/L
	1,1,1,-TCA	96	10	µg/L
	Chloroform	89	21.5-22	µg/L
	TCE	43	10-10.5	µg/L
Groundwater (HydroPunch) Results				
VOCs	TCE	58	65-68	µg/L
	cis-1,2-DCE	7.5	65-68	µg/L
	1,1-DCE	2.9	65-68	µg/L
Note * Corresponding TBV is listed in parentheses.				

Additional soil gas characterization work at B1532 was performed under the SVE Decision Study. The SVE Decision Study at B1532 included the installation of 4 triple-completion vapor wells, and VOC vapor sampling and profiling in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000a) approved by the BCT. Maximum concentrations of TCE and 1,1-DCE in soil gas detected during the SVE decision study were 12.4 µg/L and 12.3 µg/L, respectively. Results of the SVE Decision Study at 1532 are presented in the *SVE Decision Study Data Report* (Earth Tech, 2000b). A summary of the number and types of samples, analyses, and maximum detections during the SVE Decision Study is presented below.

B1532 SVE Decision Study Sampling Summary			
Vapor Wells	**Vapor Well Screens**	**Field GC Vapor Samples**	**Laboratory Vapor Samples**
4	12	12	4

B1532 SVE Decision Study Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	TO-14
TCE	Field GC

B1532 SVE Decision Study Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	acetone	0.01	45-55	µg/L
	benzene	0.02	45-55	µg/L
	carbon tetrachloride	0.01	45-55	µg/L
	chloroform	0.01	45-55	µg/L
	dichlorodifluoromethane	0.01	45-55	µg/L
	1,1-dichloroethane	1.58	45-55	µg/L
	1,2-dichloroethane	0.07	45-55	µg/L
	1,1-DCE	12.31	45-55	µg/L
	cis-1,2-DCE	0.07	45-55	µg/L
	ethylbenzene	0.03	45-55	µg/L
	4-ethyl toluene	0.05	45-55	µg/L
	Freon 113	0.10	45-55	µg/L
	methylene chloride	0.03	45-55	µg/L
	styrene	0.01	45-55	µg/L
	PCE	0.56	45-55	µg/L
	1,1,1-trichloroethane (TCA)	0.51	45-55	µg/L
	toluene	0.11	45-55	µg/L
	TCE	12.35	45-55	µg/L
	1,2,4-trimethylbenzene	0.05	45-55	µg/L
	xylenes (m,p)	0.12	45-55	µg/L
	xylene (o)	0.04	45-55	µg/L

A four-month supplementary SVE test was performed at Building 1532 as a component of the SVE decision study. The SVE test demonstrated effective VOC removal using two vapor wells, and VOC concentrations were significantly reduced. Final vertical profiling, confirmation sampling results, and a START analysis confirmed that RAOs for B1532 are not exceeded, and accordingly, no contaminants are present that pose adverse risk to human health or groundwater quality. The closure report recommending NFA at Building 1532 was approved by the BCT (Earth Tech, 2003). The closure report includes details of the SVE test and confirmation sampling performed at Building 1532.

Human Health Risk Assessment

The maximum cumulative residential risk was 1×10^{-7} and the non-cancer hazard index was 0.01. Based on these results, Building 1532 does not pose an adverse risk to human health.

Environmental Assessment

At the conclusion of the SVE Decision Study, 1,1-DCE (0.143 µg/L) in soil gas exceeded the WQSA threshold (0.1 µg/L [VLEACH2] for 1,1-DCE at 50 to 60 feet bgs). However, the START analysis confirmed that residual 1,1-DCE at Building 1532 does not pose a threat to groundwater quality.

Site COCs and RAOs

Based on the SCOU HHRA, the environmental assessment, and the results of the SVE Decision Study, COCs and RAOs for B1532 are listed below..

COC	RAO Source	RAO
1,1-DCE (0.143 µg/L, soil gas)	STOP	VLEACH2 – 0.1 µg/L, 50-60 feet bgs or lowest level technically and economically achievable

1,1-DCE in soil gas represents potential adverse risk to groundwater quality. No COCs representing adverse risk to human health were present at B1532.

Selected Remedy

A START analysis performed based upon the results of the SVE Decision Study confirmed that COCs are at or below the lowest level technically or economically achievable. RAOs are not exceeded for B1532. Thus, B1532 does not pose an adverse risk to human health or groundwater quality. The selected remedy for B1532 is NFA.

2.8.3.2 Building 1541

Site Description

Building 1541 (B1541), a corrosion control facility, is located in grid Q,13 (Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-15). The facility produced waste paint, paint thinner and solvents, which were sent to the Castle hazardous waste storage areas. SWMU 4.23, consisting of a grit separator and an OWS, is associated with B1541. SWMU 4.23 was an unlined concrete vault with no secondary containment or leak detection system. Wastewater from the OWS was discharged to the industrial wastewater treatment plant. The OWS (SWMU 4.23) was removed in 1995.

The surface cover at B1541 consists of a concrete-paved parking apron with driveway access and a grassy area surrounding the Quonset hangar. The B1541 site is generally underlain by interbedded silts, sandy silts, clayey silts, silty sands and sand. The surface layer is approximately 5 feet thick and composed of silty sand. A 10 to 15-foot stratum of sandy to clayey silt is below the surface layer. A 10-foot thick sand layer starts at approximately 20 feet bgs with discontinuous sand lenses at 30 and 50 feet bgs. B1541 COPCs included oils, fuels, grease, paint thinners, paint strippers and paint wastes. The OWS was the primary potential source of contamination.

Site Characterization

Soil samples were analyzed for VOCs, SVOCs, TVPH, and TEPH, and soil gas samples were analyzed for VOCs during the SCOU RI. Benzene (up to 128.8 μg/L) was detected in soil gas at 21.5 feet bgs and decreased with depth. TVPH was detected (up to 560 mg/kg at 5.5 feet bgs) in soil collected near the separator and also decreased with depth. No TEPH or TVPH were detected in samples collected from 40 feet bgs. Xylenes were detected in soil (up to 96 mg/kg) and soil gas (up to 333 μg/L). Cis-1,2-DCE was detected in soil gas at a maximum concentration of 73.2 μg/L. Sampling results from the SCOU RI indicate that most contamination is shallow and localized near the OWS. A complete presentation of RI activities and results for the B1541 site are provided in Section 7.2.11 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is included below.

B1541 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
6	6	23	21

B1541 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs/BTEX	SW8260/SW8020
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Soil Gas Analyses	
VOCs	SGVOC, E18
	TO-14

B1541 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
Petroleum Hydrocarbons	TVPH	560	5.5-6.5	mg/kg
VOCs	Xylenes	96	5.5-6.5	mg/kg
Soil Gas Results				
VOCs	Xylenes	333	5	µg/L
	Benzene	129	21.5	µg/L
	cis-1,2-DCE	73	21.5	µg/L

After the Phase 2 RI, the BCT decided that the B1541 site was not sufficiently characterized to support selection of an appropriate remedy and that contamination by aromatic VOCs and petroleum hydrocarbons required further characterization. Additional soil samples were analyzed for TVPH, TEPH, and VOCs, and soil gas samples were analyzed for VOCs to confirm the lateral and vertical extent of contaminants. The sampling and analysis was performed in accordance with the SCOU Data Gap Field Sampling Plans approved by the BCT. No TVPH, TEPH, or VOCs were detected in the soil samples. Low levels (<1 µg/L) of BTEX compounds, TCE, and PCE were detected in the soil gas samples. Benzene was detected at a concentration of 0.178 µg/L in soil gas at a depth of 61.5 feet bgs, in excess of the VLEACH2 WQSA threshold (0.1 μg/L at 50 to 60 feet bgs). However, VLEACH modeling indicated that the benzene would not result in adverse impact to groundwater (JEG, 1999). The Data Gap report concluded that the SCOU RI had characterized the extent of contamination. A complete discussion of activities and results for the data gap investigation at the B1541 site is provided in Section 4.7 of the *SCOU Data Gap Investigation Report* (JEG, 1999). A summary of the number and types of samples, analyses, and maximum detections during the Data Gap Investigation is presented below.

B1541 Data Gap Sampling Summary			
Soil Borings	**Soil Vapor Wells**	**Soil Samples**	**Soil Gas Samples**
3	1	9	12

B1541 Data Gap Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	TO-14

B1541 Data Gap Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	1,2,4-Trimethylbenzene	0.159	16	µg/L
	1,3,5-Trimethylbenzene	0.037	16	µg/L
	1,1-Dichloroethane	0.004	15	µg/L
	1,1,1-Trichloroethane	0.366	15	µg/L
	2-Hexanone	0.019	21	µg/L
	4-Ethyltoluene	0.094	40	µg/L
	Acetone	0.431	46	µg/L
	Benzene	0.239	21	µg/L
	Carbon disulfide	0.097	46	µg/L
	Chloroform	0.059	16	µg/L
	cis-1,2-DCE	0.011	16	µg/L
	Ethylbenzene	0.127	61.5	µg/L
	2-butanone (MEK)	0.215	46	µg/L
	Methyl isobutyl ketone	0.013	21	µg/L
	Methylene chloride	0.006	31	µg/L
	n-Hexane	0.214	16	µg/L
	NMOC	26.511	61.5	µg/L
	Styrene	0.022	61.5	µg/L
	PCE	0.054	50	µg/L
	Toluene	0.646	21	µg/L
	TCE	0.048	50	µg/L
	Xylenes	0.368	40	µg/L

In July 1999, 192 cubic yards of petroleum hydrocarbon-impacted soil were excavated from the vicinity of the former OWS (MWH, 2002c). Soil samples were collected from the excavation bottom and sidewalls and analyzed for TEPH, TVPH, and VOCs. TEPH was detected up to 1,600 mg/kg, and TVPH was detected up to 1,900 mg/kg (MWH, 2002c). Three exploratory trenches were excavated in August 1999 to further characterize the extent of the petroleum hydrocarbons. The trenches extended outward from the former excavation to the west, southwest, and south. The trenches were excavated to a depth of 12 feet bgs. Soil samples were collected from various locations within the trenches and analyzed for TEPH, TVPH, and VOCs. TEPH was detected up to 2,055 mg/kg, and the results suggested that contaminants leaked into the vadose zone from the drainage lines and catch basins inside B1541 and to the south of the former OWS. The bottoms of the catch basins and the depths of the drain lines are approximately 3 feet bgs, according to design plans for B1541. These results and data from previous investigations suggest that this contamination is not associated with the former OWS (SWMU 4.23) but derives from B1541.

A supplemental investigation was conducted in April 2001 (MWH, 2002c), and included the completion of 8 soil borings to a maximum depth of approximately 20 feet bgs at and around B1541. Samples were analyzed for TEPH, TVPH, VOCs, and SVOCs. TEPH was detected up to 3,040 mg/kg, and TVPH was detected up to 1,330 mg/kg. The hydrocarbons were primarily localized near the catch basins in the hangar, at depths less than 5 feet bgs (MWH, 2002c).

In July 2002, 351 cubic yards (266 cubic yards from inside B1541, 85 cubic yards from outside B1541) of hydrocarbon-contaminated soil were excavated based upon the results of previous sampling (MWH, 2002c). Nine confirmation samples were collected from the excavation inside B1541, and five confirmation samples were collected from the excavation outside B1541. TVPH was detected up to 665 mg/kg, indicating the need for additional excavation. In September 2002, an additional 100 cubic yards (35 cubic yards inside B1541, 65 cubic yards outside B1541) were excavated based upon the results of the July 2002 confirmation sampling. Nine additional confirmation samples were collected from the excavation inside B1541, and five additional confirmation samples were collected from the excavation outside B1541. The samples were analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. The results of all September 2002 confirmation samples were below RAOs. Therefore, B1541 does not pose an adverse threat to human health or the environment. A closure report detailing the excavation activities and confirmation sampling results, and recommending NFA for B1541 and SWMU 4.23 was approved by the BCT (MWH, 2002c).

<u>**Human Health Risk Assessment**</u>

The maximum cumulative residential risk was 1 x 10^{-8} and the non-cancer hazard index was 0.05. Based on these results, B1541 does not pose an adverse risk to human health.

Environmental Assessment

TVPH (1,900 mg/kg) and TEPH (3,040 mg/kg) in soil and benzene (128.8 μg/L) and cis-1,2-DCE (73.2 μg/L) in soil gas exceeded WQSA thresholds (100 mg/kg for TVPH in soil at 0 to 20 feet bgs; 1,500 mg/kg for TEPH in soil at 0 to 20 feet bgs; 20.1 μg/L [VLEACH2] for benzene at 20 to 30 feet bgs; 9.1 μg/L [VLEACH2] for cis-1,2-DCE at 20 to 30 feet bgs). Accordingly, soil contamination at B1541 posed a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, and supplemental investigation results, site COCs and RAOs for B1541 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (1,900 mg/kg, soil)	DLM	100 mg/kg, 0 to 20 feet bgs
TEPH (3,040 mg/kg, soil)	DLM	1,500 mg/kg, 0 to 20 feet bgs
benzene (128.8 4 μg/L, soil gas)	STOP	VLEACH2 - 20.1 μg/L, 20 to 30 feet bgs or lowest level technically and economically achievable
cis-1,2-DCE (73.2 μg/L, soil gas)	STOP	VLEACH2 – 9.1 μg/L, 20 to 30 feet bgs or lowest level technically and economically achievable

TVPH and TEPH in soil, and benzene and cis-1,2-DCE in soil gas represented adverse risk to groundwater quality. No COCs representing adverse risk to human health were present at B1541.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at B1541. Thus, B1541 does not pose an adverse risk to human health or groundwater quality. The selected remedy for B1541 is NFA.

2.8.3.3 SWMU 4.5

Site Description

SWMU 4.5 was an OWS that served Building 79 (B79) (grid S,12, Plate 1, Appendix A), a wash rack facility associated with the PFFA. A site map is provided in Appendix E (Figure E-16). The OWS consisted of an unlined, concrete vault. The primary COPCs at SWMU 4.5 were oils, fuels and soap associated with PFFA operations. The OWS was a possible source of contamination through cracks in the concrete vault and leaks in the underground pipelines.

Site Characterization

Two soil borings (PFFASB10 and PFFASB11) were drilled and sampled in the vicinity of SWMU 4.5 during SCOU RI activities at the PFFA. Soil samples were analyzed for VOCs, SVOCs, TVPH, and TEPH, and metals, and soil gas samples were analyzed for VOCs. Detected VOCs include ethylbenzene (up to 0.73 µg/kg at 20.5 feet bgs), xylenes (up to 2.0 µg/kg at 20.5 feet bgs), 1,4-dichlorobenzene (up to 0.68 µg/kg at 20.5 feet bgs) and methylene chloride (maximum concentration of 3.3 µg/kg at 10.5 feet bgs); however, methylene chloride was also detected in the laboratory blank and subsequently qualified as laboratory contamination. Metals detected above TBVs include barium (141 mg/kg at 15.5 feet bgs), beryllium (0.9 mg/kg at 15.5 feet bgs), cobalt (8.5 mg/kg at 15.5 feet bgs), and chromium (26.3 mg/kg at 15.5 feet bgs). Soil gas detections included benzene (up to 31.7 µg/L), xylenes (up to 22.3 µg/L), toluene (up to 6.9 µg/L), 1,1-DCE (up to 1.6 µg/L), and TCE (up to 0.05 µg/L). The SCOU RI/FS identified a data gap at SWMU 4.5 for SVOCs and metals beneath the OWS. B79, as part of the PFFA, was included in the SCOU ROD Part 1 as a petroleum hydrocarbon only site that is excluded from CERCLA but subject to the State of California's laws and regulations pertinent to USTs and the protection of groundwater quality. A complete presentation of RI activities and results for SWMU 4.5 is provided in Section 7.2.1 of the *SCOU RI/FS* (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.5 SCOU RI Sampling Summary			
Soil Borings	Soil Gas Probes	Soil Samples	Soil Gas Samples
2	2	8	5

SWMU 4.5 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8020/SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Metals	SW6010
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

SWMU 4.5 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration***	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	Xylenes	2.04	20.5	µg/kg
	Ethylbenzene	0.73	20.5-22	µg/kg
Metals	Barium	141 (109)	15.5-16.5	mg/kg
	Beryllium	0.9 (0.39)	15.5-16.5	mg/kg
	Cobalt	8.5 (7.0)	15.5-16.5	mg/kg
	Chromium	26.3 (19.1)	15.5-16.5	mg/kg
Soil Gas Results				
VOCs	Benzene	31.7	21.5	µg/L
	Xylenes	22.3	21.5	µg/L
	Toluene	6.9	21.5	µg/L
	1,1-DCE	1.6	21.5	µg/L
	TCE	0.051	21.5	µg/L
Note * Corresponding TBVs are listed in parentheses.				

The OWS was removed prior to 1995 in accordance with the CAFB tank and OWS removal program. No record of the removal or any associated sampling is available.

In 1999, 4 soil borings were drilled at the location of the former OWS to a maximum depth of 20.5 feet bgs. Soil samples were collected and analyzed for TEPH, TVPH, VOCs, SVOCs, and metals. TVPH was detected up to 1,800 mg/kg and benzene was detected up to 2,900 mg/kg (GRC, 1999).

In July 2002, an additional 789 cubic yards of soil were excavated from SWMU 4.5 to address residual hydrocarbon contamination. A total of 8 confirmation samples were collected from the bottom and sidewalls of the excavation, and analyzed for TEPH, TVPH, VOCs, SVOCs, oil and grease, and metals. The results of all September 2002 confirmation samples were below RAOs. Therefore, SWMU 4.5 does not pose an adverse threat to human health or the environment. A closure report detailing the excavation activities and confirmation sampling results, and recommending NFA for SWMU 4.5 was approved by the BCT (Parsons, 2002).

Human Health Risk Assessment

The HHRA performed for the PFFA included SWMU 4.5 (as B79). The maximum cumulative residential risk for the PFFA was 2×10^{-6} and the non-cancer hazard index was 0.01. The risk was primarily due to PAHs. However, since no contaminants were detected at SWMU 4.5 in excess of HHRA RAOs, SWMU 4.5 did not contribute to adverse human health risk at the PFFA.

Environmental Assessment

TVPH (1,800) in soil and benzene (2,900 mg/kg, 31.7 µg/L) in soil and soil gas exceeded WQSA thresholds (100 mg/kg for TVPH at 0 to 20 feet bgs; 291.5 mg/kg [VLEACH2] for benzene at 0 to 10 feet bgs; 20.1 µg/L [VLEACH2] for benzene at 20 to 30 feet bgs).

Site COCs and RAOs

Based on the HHRA and the environmental assessment, and supplemental investigation results, site COCs and RAOs for SWMU 4.5 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (1,800 mg/kg, soil)	DLM	100 mg/kg at 0 to 20 feet bgs
benzene (2,900 mg/kg, soil)	STOP	VLEACH2 – 291.5 mg/kg, 0 to 10 feet bgs or lowest level technically and economically achievable
benzene (31.7 µg/L, soil gas)	STOP	VLEACH2 – 20.1 µg/L, 20 to 30 feet bgs or lowest level technically and economically achievable

TVPH in soil and benzene in soil and soil gas represented adverse risk to groundwater quality. No COCs representing adverse risk to human health were present at SWMU 4.5.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.5. Thus, SWMU 4.5 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.5 is NFA.

2.8.3.4 SWMU 4.7

Site Description

Building 175 (B175) (grid P,10, Plate 1, Appendix A) was built in 1980 to house flight simulators for aircrew training and has two OWSs (SWMUs 4.7 and 4.8). A site map is provided in Appendix E (Figure E-17). SWMU 4.7 consisted of a steel, unlined, OWS with a capacity of 150 gallons. B175 was included in the SCOU ROD Part 1 as a petroleum hydrocarbon only site that is excluded from CERCLA but subject to the State of California's laws and regulations pertinent to USTs and the protection of groundwater quality. SWMU 4.7 and 4.8 were delayed until the SCOU ROD Part 2 in order to evaluate the potential presence of SVOCs and metals.

Site Characterization

The primary COPCs at SWMU 4.7 were oils, hydraulic fluid, jet fuel and solvents associated with B175 operations. The OWS was a possible source of contamination through holes in the steel vault and leaks in the underground pipelines. During the SCOU RI, soil samples were analyzed for TEPH, TVPH, and VOCs, and soil gas samples were analyzed for VOCs. No detections were reported in soil samples. Low levels of toluene (up to 0.83 µg/L), benzene (up to 0.038 µg/L) and Freon 113 (up to 0.40 µg/L) were reported, in addition to trace concentrations of TCE, PCE and xylenes. The SCOU RI identified a SVOC and metals data gap underneath the OWS. A complete presentation of RI activities and results for SWMU 4.7 is provided in Section 7.2.5 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.7 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
1	0	3	1

SWMU 4.7 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Soil Gas Analyses	
VOCs	E18

SWMU 4.7 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	Toluene	0.83	21.5	µg/L
	Benzene	0.038	21.5	µg/L
	Freon 113	0.40	21.5	µg/L

The OWS was removed in 1996 (Laguna, 1997) and a confirmation soil sample was collected from the bottom of the excavation and analyzed for VOCs, TVPH, and TEPH. Methylene chloride was detected at 22 µg/kg, but was also detected in the laboratory blank. TEPH was detected at less than 50 mg/kg (Laguna, 1997).

Additional confirmation sampling was conducted in 2001 and consisted of the advancement and sampling of 4 soil borings (MWH, 2002d). Soil samples were analyzed for VOCs, TVPH, TEPH, and SVOCs. Select samples were also analyzed for metals. TVPH (as gasoline), TEPH (as diesel and motor oil), methylene chloride, and bis(2-ethylhexyl)phthalate were detected; however, none of the detections exceeded HHRA RAOs or WQSA thresholds. Therefore, SWMU 4.7 does not pose an adverse risk to human health or the environment. The closure report detailing the confirmation sampling results and recommending NFA for SWMU 4.7 was approved by the BCT (MWH, 2002d).

Human Health Risk Assessment

No contamination above risk-screening levels was identified at SWMU 4.7 during the RI. Thus, the HHRA concluded that SWMU 4.7 does not pose an adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.7 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No contamination is present at SWMU 4.7 at concentrations posing an adverse risk to human health or groundwater quality.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.7. Therefore, SWMU 4.7 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.7 is NFA.

2.8.3.5 SWMU 4.8

Site Description

SWMU 4.8 was an in-ground OWS located at the south end of B175 (grid P,10, Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-18). The OWS consisted of an unlined, steel vault with a capacity of approximately 150 gallons. The primary contaminants of potential concern were oils, hydraulic fluid, diesel, jet fuel and solvents associated with B175 operations. The OWS was a possible source of contamination through holes in the steel vault and leaks in the underground pipelines.

Site Characterization

During the SCOU RI, soil samples were analyzed for TEPH, TVPH, and VOCs, and soil gas samples were analyzed for VOCs. No compounds were detected in the soil samples. Soil gas detections included toluene (15 µg/L) and trace concentrations of Freon 113, PCE, and benzene. A complete presentation of RI activities and results for SWMU 4.8 is provided in Section 7.2.5 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.8 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
2	0	5	1

SWMU 4.8 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
Petroleum Hydrocarbons	CA8015/TVPH & TEPH
Soil Gas Analyses	
VOCs	E18

SWMU 4.8 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Gas Results				
VOCs	Toluene	15.0	21.5	µg/L
	Freon 113	0.44	21.5	µg/L
	PCE	0.29	21.5	µg/L
	Benzene	0.018	21.5	µg/L

The OWS was partially removed in 1996 and the remaining portions were abandoned in place with cement (Laguna, 1997). A confirmation soil sample was collected from below the OWS and analyzed for VOCs, TVPH, and TEPH. Compounds detected in the confirmation sample include TEPH as motor oil

(190 mg/kg), acetone (10 μg/kg), carbon disulfide (1 μg/kg), Freon 113 (7.5 μg/kg), and methylene chloride (11 μg/kg) (Laguna, 1997).

Additional confirmation sampling was conducted in 2001 and consisted of the advancement and sampling of 4 soil borings (MWH, 2002d). Soil samples were analyzed for VOCs, TVPH, TEPH, and SVOCs. Select samples were also analyzed for metals. TVPH (as gasoline), TEPH (as motor oil), and methylene chloride were detected; however, none of the detections exceeded HHRA RAOs or WQSA thresholds. Therefore, SWMU 4.8 does not pose an adverse risk to human health or the environment. The closure report detailing the confirmation sampling results and recommending NFA for SWMU 4.8 was approved by the BCT (MWH, 2002d).

Human Health Risk Assessment

No contamination above risk-screening levels was identified at SWMU 4.8 during the RI. Thus, the HHRA concluded that SWMU 4.8 does not pose an adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.8 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No contamination is present at SWMU 4.8 at concentrations posing an adverse risk to human health or groundwater quality.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.8. Therefore, SWMU 4.8 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.8 is NFA.

2.8.3.6 SWMU 4.14

Site Description

SWMU 4.14 consisted of an in-ground, unlined OWS (#554) located behind B554 (grid S,11 of Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-19). The OWS contained two concrete vaults, one chamber for a grit trap and the other for a flotation vessel, with a combined capacity of approximately 300 gallons. The primary COPCs were fuels, oil, hydraulic fluid, detergents and solvents associated with Castle Recycling Center (B554) operations and automobile repairs at the Castle Hobby Center (B551). The OWS was a possible source of contamination through cracks in the concrete vaults and leaks in the underground pipelines.

Site Characterization

During the SCOU RI, soil samples were collected and analyzed for VOCs, TEPH, TVPH, and lead. Soil gas samples were analyzed for VOCs. No target analytes were detected, but a data gap for SVOCs beneath the OWS was identified. A complete presentation of RI activities and results for SWMU 4.14 is provided in Section 7.2.24 of the *SCOU RI/FS* (JEG, 1997a). A summary of the number and types of samples and analyses during the SCOU RI is presented below.

SWMU 4.14 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
1	1	2	2

SWMU 4.14 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
Lead	SW7421
Soil Gas Analyses	
VOCs	SGVOC
	TO-14

The OWS was removed in 1996 and 2 confirmation samples were collected from the bottom of the excavation (Laguna, 1997). The samples were analyzed for TEPH, TVPH, and VOCs. TEPH was detected in both samples at less than 20 mg/kg.

Additional confirmation sampling was conducted in 2001 and consisted of the advancement and sampling of 4 soil borings (MWH, 2002d). Soil samples were analyzed for VOCs, TVPH, TEPH, and SVOCs. Select samples were also analyzed for metals. TVPH (as gasoline), TEPH (as motor oil), methylene chloride, bis(2-ethylhexyl)phthalate, 1,2,4-trimethylbenzene, and napthalene were detected; however, none of the detections exceeded HHRA RAOs or WQSA thresholds (MWH, 2002d). Additional VOCs were detected that do not have corresponding WQSA thresholds. A screening conducted in accordance with U.S. EPA guidance concluded that the additional VOCs would not result in adverse impact to groundwater quality (MWH, 2002d). Therefore, SWMU 4.14 does not pose an adverse risk to human health or the environment. The closure report detailing the confirmation sampling results and recommending NFA for SWMU 4.14 was approved by the BCT (MWH, 2002d).

Human Health Risk Assessment

The maximum cumulative residential risk was 9×10^{-7} and the non-cancer hazard index was 0.02. Based on these results, SWMU 4.14 does not pose an adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.14 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No contamination is present at SWMU 4.14 at concentrations posing an adverse risk to human health or groundwater quality.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.14. Therefore, SWMU 4.14 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.14 is NFA.

2.8.3.7 SWMU 4.15

Site Description

SWMU 4.15 consisted of an aboveground OWS located east of B917 at the base wastewater treatment plant (grid S,12, Plate 1, Appendix A). A site map is provided in Appendix E (Figure E-20). The OWS contained an aboveground concrete vault (9 feet long, 3 feet wide, 3 feet tall, 6-inch thick) with no liner, secondary containment, or leak detection system. According to the RFA (DTSC, 1990), the OWS received the combined effluent from other OWSs located at Buildings 59, 79, 508, 1509, 1521, 1260A and 1260B. The primary COPCs were oils, fuels and soap associated with PFFA operations. The OWS was a possible source of contamination through cracks in the concrete vault and leaks in the underground pipelines.

Site Characterization

During the SCOU RI, soil samples were analyzed for TEPH, TVPH, VOCs, and SVOCs, and soil gas samples were analyzed for VOCs. The following compounds, and their maximum concentrations, were detected in soil: 1,2,4-trimethylbenzene (16 μg/kg), naphthalene (15 μg/kg), xylenes (8.7 μg/kg), benzene (3.3 μg/kg), TVPH (570 mg/kg), TEPH (160 mg/kg), and pyrene (0.49 mg/kg). A data gap for SVOCs was identified under the OWS. A complete presentation of RI activities and results for SWMU 4.15 is provided in Section 7.2.1 of the SCOU RI/FS (JEG, 1997a). A summary of the number and types of samples, analyses, and maximum detections during the SCOU RI is presented below.

SWMU 4.15 SCOU RI Sampling Summary			
Soil Borings	**Soil Gas Probes**	**Soil Samples**	**Soil Gas Samples**
1	2	4	6

SWMU 4.15 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Analyses	
VOCs	SW8260
SVOCs	SW8270
Petroleum Hydrocarbons	CA8015/TVPH & TEPH

SWMU 4.15 SCOU RI Analysis Summary	
Contaminant Category	**Analytical Method**
Soil Gas Analyses	
VOCs	SGVOC

SWMU 4.15 SCOU RI Maximum Detections				
Contaminant Category	**Contaminant of Potential Concern**	**Maximum Concentration**	**Depth (feet bgs)**	**Units**
Soil Results				
VOCs	1,2,4-Trimethylbenzene	16.0	39-40	µg/kg
	Naphthalene	15.0	39-40	µg/kg
	Xylenes	8.7	15.5-16.5	µg/kg
	Benzene	3.3	9-10	µg/kg
Petroleum Hydrocarbons	TVPH	570	9.5-10.5	mg/kg
	TEPH	160	14-15	mg/kg
SVOCs	Naphthalene	2.1	14-15	mg/kg
	Pyrene	0.49	14-15	mg/kg

The OWS was removed in 1998 during closure of the wastewater treatment plant and in accordance with the CAFB tank and OWS removal program. Seven confirmation soil samples were collected during plant closure (Appendix E, Figure E-20): 2 samples were collected adjacent to the concrete vault prior to removal and analyzed for metals; 5 samples were collected after removal of the concrete vault, beneath the former vault location, and analyzed for metals, SVOCs, BTEX, and TEPH. Several metals, SVOCs, and TEPH were detected; however, none of the detections exceeded HHRA RAOs or WQSA thresholds. Therefore, SWMU 4.15 does not pose an adverse risk to human health or the environment. The closure report detailing the confirmation sampling results and recommending NFA for SWMU 4.15 was approved by the BCT (JEG, 2002a).

Human Health Risk Assessment

Although SWMU 4.15 is within the PFFA area for which the HHRA was performed, there were no SCOU RI soil data for SWMU 4.15 due to lack of soil gas contamination in the area for the grease trap.

However, since no contaminants were detected in excess of HHRA RAOs during the post-RI investigation, SWMU 4.15 does not pose an adverse risk to human health.

Environmental Assessment

TVPH (570 mg/kg) in soil exceeded the WQSA threshold (100 mg/kg for TVPH in soil at 0 to 20 feet bgs). Accordingly, soil contamination at SWMU 4.15 posed a threat to groundwater quality as a continuing contaminant source.

Site COCs and RAOs

Based on the results of the environmental assessment, site COCs and RAOs for SWMU 4.15 are listed below.

COC (concentration)	RAO Source	RAO
TVPH (570 mg/kg, soil)	DLM	100 mg/kg, 0 to 20 feet bgs

TVPH in soil represented adverse risk to groundwater quality. No COCs representing adverse risk to human health were present at SWMU 4.15.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.15. Therefore, SWMU 4.15 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.15 is NFA.

2.8.3.8 SWMU 4.17

Site Description

SWMU 4.17 was an OWS located adjacent to Building 1260. A site map is provided in Appendix E (Figure E-21). SWMU 4.17 consisted of a below-grade sump that used gravity to separate waste oils, fuels, and hydraulic fluids from wastewater generated from aircraft/vehicle maintenance and fuels management. Contaminated wastewater was generally washed into drains at maintenance facilities, which fed into OWSs. Separated wastewater was discharged to the sanitary sewer or the industrial waste line and eventually to the wastewater treatment plant. Residue from the OWSs was periodically removed and disposed of or recycled offsite (DTSC, 1990).

Site Characterization

SWMU 4.17 was removed in 1996 in accordance with the CAFB tank and OWS removal program. Removal included excavation and demolition of the settling vaults, excavation of contaminated soil, confirmation sampling, and site restoration. Although no compounds were detected in excess of HHRA RAOs or WQSA thresholds, data gaps associated with the confirmation sampling resulted in additional investigation in October and November 2002. The 2002 investigation was performed in accordance with a letter work plan approved by the BCT (JEG, 2002b). Four soil borings were advanced (Appendix E, Figure E-21), and soil samples were collected and analyzed for TEPH, TVPH, VOCs, and SVOCs. All samples were non-detect for all analytes. Therefore, SWMU 4.17 does not pose an adverse risk to human health or the environment. The investigation summary report for SWMU 4.17, including recommendation of NFA, was approved by the BCT (JEG, 2002c).

Human Health Risk Assessment

The HHRA performed for B1260 included SWMU 4.17. The maximum cumulative residential risk for B1260 was 1×10^{-5} and the non-cancer hazard index was 0.05. The risk was primarily due to 1,4-dichlorobenzene and methylene chloride. However, since no contaminants were detected at SWMU 4.17 in excess of HHRA RAOs, SWMU 4.17 did not contribute to adverse human health risk at B1260.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.17 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No contamination is present at SWMU 4.17 at concentrations posing an adverse risk to human health or groundwater quality.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.17. Therefore, SWMU 4.17 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.17 is NFA.

2.8.3.9 SWMU 4.18

Site Description

SWMU 4.18 was an OWS located adjacent to Building 1260. A site map is provided in Appendix E (Figure E-22). SWMU 4.18 consisted of a below-grade sump that used gravity to separate waste oils, fuels, and hydraulic fluids from wastewater generated from aircraft/vehicle maintenance and fuels management. Contaminated wastewater was generally washed into drains at maintenance facilities, which fed into OWSs. Separated wastewater was discharged to the sanitary sewer or the industrial waste line and eventually to the wastewater treatment plant. Residue from the OWSs was periodically removed and disposed of or recycled offsite (DTSC, 1990).

Site Characterization

SWMU 4.18 was removed in 1997 in accordance with the CAFB tank and OWS removal program. Removal included excavation and demolition of the settling vaults, excavation of contaminated soil, confirmation sampling, and site restoration. Included in the excavation was the location of SCOU RI soil boring B1260SB01, where 1,4-dichlorobenzene was detected in excess of the HHRA RAO at 5 feet bgs and 10 feet bgs. A confirmation sample collected in 1999 had benzo(a)pyrene (0.45 mg/kg) in excess of the HHRA RAO. In order to further evaluate the presence of benzo(a)pyrene, and to address data gaps associated with the confirmation sampling, additional investigation was performed in October and November 2002. The 2002 investigation was performed in accordance with a letter work plan approved by the BCT (JEG, 2002d). Five soil borings were advanced, including one at the location of the previous benzo(a)pyrene detection, and four at locations corresponding to the former excavation sidewalls. Soil samples were collected and analyzed for TEPH, TVPH, VOCs, and SVOCs. Toluene and TEPH were detected, but below HHRA RAOs and WQSA thresholds. The previous PAH detection was concluded to be a likely result of incorporation of asphalt in the soil sample. Therefore, SWMU 4.18 does not pose an adverse risk to human health or the environment. The investigation summary report for SWMU 4.18, including recommendation of NFA, was approved by the BCT (JEG, 2002c).

Human Health Risk Assessment

The HHRA performed for B1260 included SWMU 4.18. The maximum cumulative residential risk for B1260 was 1×10^{-5} and the non-cancer hazard index was 0.05. The risk was primarily due to 1,4-dichlorobenzene at SWMU 4.18 and methylene chloride, each contributing approximately 50 percent. The methylene chloride was determined to be a laboratory contaminant due to its presence in the laboratory blank. The risk associated with 1,4-dichlorobenzene was calculated to be 4×10^{-6}. No other COPCs had an individual risk in excess of 1×10^{-6}. The concentration of 1,4-dichlorobenzene at SWMU 4.18 (11.5 mg/kg) in soil exceeded the HHRA RAO (3.6 mg/kg for 1,4-dichlorobenzene), and thus represented adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.18 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for SWMU 4.18 are listed below.

COC (concentration)	RAO Source	RAO
1,4-dichlorobenzene (11.5 mg/kg, soil)	HHRA	3.6 mg/kg

1,4-dichlorobenzene in soil represented an adverse risk to human health. No COCs representing adverse risk to groundwater quality were present at SWMU 4.18.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.18. Therefore, SWMU 4.18 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.18 is NFA.

2.8.3.10 SWMU 4.29

Site Description

SWMU 4.29 was a hazardous waste accumulation point that served Building 1260 and consists of a concrete platform with a drain. A site map is provided in Appendix E (Figure E-23). Hazardous fluids were temporarily stored in drums at the site.

Site Characterization

SWMU 4.29 was not investigated during the SCOU RI. Five soil borings were advanced at SWMU 4.29 in 2002 to evaluate the potential for releases from the concrete pad. Soil samples were analyzed for metals, TEPH, TVPH, VOCs, and SVOCs. Several metals exceeded the TBVs, and TEPH, TVPH, toluene, and bis(2-ethylhexl)phthlate were detected; however, no concentrations exceeded HHRA RAOs or WQSA thresholds. Therefore, SWMU 4.29 does not pose an adverse risk to human health or the environment. The investigation summary report for SWMU 4.29, including recommendation of NFA, was approved by the BCT (JEG, 2002c).

Human Health Risk Assessment

Although SWMU 4.29 is in the vicinity of B1260 for which the HHRA was performed, there were no SCOU RI soil data for SWMU 4.29. However, since no contaminants were detected in excess of HHRA RAOs during post-RI sampling, SWMU 4.29 does not pose an adverse threat to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, SWMU 4.29 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No contamination is present at SWMU 4.29 at concentrations posing an adverse risk to human health or groundwater quality.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at SWMU 4.29. Therefore, SWMU 4.29 does not pose an adverse risk to human health or groundwater quality. The selected remedy for SWMU 4.29 is NFA.

2.8.3.11 PCB-4

Site Description

Polychlorinated Biphenyl 4 (PCB-4) is a PCB spill area near B534 in grid S,11 (Plate 1). A site map is provided in Appendix E (Figure E-24). Sometime between November 1979 and January 1980, an undetermined quantity of oil containing PCBs leaked onto the ground from a transformer mounted on a platform at the west end of B534. The primary COPCs were PCBs. Transformer spills and leaks were the source of contamination.

Site Characterization

Soil samples were collected during three previous investigations at PCB-4 (two in 1980 and one in 1982). The highest PCB concentration (188,000 mg/kg) was found in a soil sample collected in January 1980 from beneath the transformer platform. During a spill cleanup effort in October 1982, contaminated soil was excavated from the PCB-4 site and low levels of PCBs (maximum concentration of 8 mg/kg) were reported in the confirmation soil samples. No soil samples were collected during the SCOU RI because the site had been closed in accordance with applicable Toxic Substances Control Act (TSCA) requirements. A complete presentation of RI activities and results for the PCB-4 site is provided in Section 7.2.35 of the *SCOU RI/FS* (JEG, 1997a).

PCB-4 had originally been included in the SCOU ROD Part 1 as a NFA site. However, based on comments received from the DTSC on the SCOU ROD Part 1 regarding the adequacy of site characterization relative to CERCLA decision criteria, additional investigation was conducted at PCB-4 in accordance with an approved work plan (JEG, 2002e). Subsequent excavation was performed at PCB-4 in accordance with an approved remedial action memorandum (JEG, 2002g). The sampling methodology was based upon U.S. EPA guidance (U.S. EPA, 1986). A total of 22 soil borings were advanced to a maximum depth of 5 feet bgs and sampled at 1-foot intervals. The results indicated that

PCB concentrations of up to 10 mg/kg were detected but were confined to the location of the former transformer pad (JEG, 2002f).

Ssoil excavation and disposal was conducted at PCB-4 in accordance with the *Project Activities Work Plan* (JEG, 2002f) and *Action Memorandum* (JEG, 2002g), both approved by the BCT. A total of 435 tons of soil were excavated; 7 tons were designated as TSCA hazardous waste and disposed of at a Class I Landfill, and the remaining 428 tons were designated as non-hazardous waste and disposed of at a Class II Landfill. Results of confirmation sampling indicate that no PCB contamination is present in excess of Castle Airport RAOs. Therefore, PCB-4 does not pose an adverse risk to human health or the environment. The removal action and investigation summary detailing the excavation activities and confirmation sampling results, and recommending NFA for PCB-4, was approved by the BCT (JEG, 2002h).

Human Health Risk Assessment

The maximum cumulative residential risk was 6×10^{-5}. PCB concentrations (10 mg/kg) in soil exceeded the HHRA RAO (0.21 mg/kg), and thus represented adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, PCB-4 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for PCB-4 are listed below.

COC (concentration)	RAO Source	RAO
PCB (10 mg/kg)	HHRA	0.21 mg/kg

PCB in soil represented an adverse risk to human health. No COCs representing adverse risk to groundwater quality are present at PCB-4.

Selected Remedy

Contaminated soil was excavated during a removal action performed at PCB-4. Confirmation sampling results confirm that the RAOs have been achieved. Therefore, PCB-4 does not pose an adverse risk to human health or the groundwater quality. The selected remedy for PCB-4 is NFA.

2.8.3.12 PCB-5

Site Description

Polychlorinated Biphenyl 5 (PCB-5) is a PCB spill area near B404 in grid R,10 (Plate 1). A site map is provided in Appendix E (Figure E-25). Prior to 1980, an undetermined quantity of oil containing PCBs leaked onto the ground from a transformer at the southwest end of B404. The primary COPCs were PCBs. Transformer spills and leaks were the source of contamination.

Site Characterization

Soil samples were collected during a previous investigation at PCB-5 in August 1980. The highest PCB concentration (32,810 mg/kg) was found in a surface soil sample collected near the transformer pad. During a spill cleanup effort in September 1982, contaminated soil was excavated from the PCB-5 site and low levels of PCBs (maximum concentration of 14 mg/kg) were found in the confirmation soil samples. No soil samples were collected during the SCOU RI because the site had been closed in accordance with applicable TSCA requirements. A complete presentation of RI activities/results for the PCB-5 site is provided in Section 7.2.36 of the *SCOU RI/FS* (JEG, 1997a).

PCB-5 had originally been included in the SCOU ROD Part 1 as a NFA site. However, based on comments received from the DTSC on the SCOU ROD Part 1 regarding the adequacy of site characterization relative to CERCLA decision criteria, additional investigation was conducted at PCB-5 in accordance with an approved work plan (JEG, 2002e). Subsequent excavation was performed at PCB-5 in accordance with an approved remedial action memorandum (JEG, 2002g). The sampling methodology was based upon U.S. EPA guidance (U.S. EPA, 1986). A total of 25 soil borings were advanced to a maximum depth of 6 feet bgs and sampled at 1-foot intervals. The results indicated that PCB concentrations (maximum detection of 57 mg/kg) at PCB-5 were localized around the edges of the former transformer pad and west of the pad (JEG, 2002f).

Soil excavation and disposal was conducted at PCB-5 in accordance with the *Project Activities Work Plan* (JEG, 2002f) and *Action Memorandum* (JEG, 2002g), both approved by the BCT. A total of 179 tons of soil were excavated; 26 tons were designated as TSCA hazardous waste and disposed of at a Class I Landfill, and the remaining 153 tons were designated as non-hazardous waste and disposed of at a Class II Landfill. Results of confirmation sampling indicate that no PCB contamination is present in excess of Castle Airport RAOs. Therefore, PCB-5 does not pose an adverse risk to human health or the environment. The removal action and investigation summary detailing the excavation activities and confirmation sampling results, and recommending NFA for PCB-5, was approved by the BCT (JEG, 2002h).

Human Health Risk Assessment

The maximum cumulative residential risk was 3 x 10^{-4}. PCB concentrations (57 mg/kg) in soil exceeded the HHRA RAO (0.21 mg/kg), and thus represented adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, PCB-5 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

Based on the HHRA and the environmental assessment, site COCs and RAOs for PCB-5 are listed below.

COC (concentration)	RAO Source	RAO
PCB (57 mg/kg)	HHRA	0.21 mg/kg

PCB in soil represented an adverse risk to human health. No COCs representing adverse risk to groundwater quality are present at PCB-5.

Selected Remedy

Contaminated soil was excavated during a removal action performed at PCB-5. Confirmation sampling results confirm that the RAOs have been achieved. Therefore, PCB-5 does not pose an adverse risk to human health or groundwater quality. The selected remedy for PCB-5 is NFA.

2.8.3.13 PCB-6

Site Description

Polychlorinated Biphenyl 6 (PCB-6) is a PCB spill area near B851 in grid T,11 (Plate 1). A site map is provided in Appendix E (Figure E-26). Between January and March 1982, an estimated one to 15 gallons of transformer oil containing PCBs spilled onto the asphalt and soil at B851 from a transformer mounted on a truck. The primary COPCs were PCBs. Transformer spills and leaks were the source of contamination.

Site Characterization

Soil samples were collected during a previous investigation at PCB-6 in June 1983. The highest PCB concentration (9 mg/kg) was found in a surface soil sample collected in the yard area. No documented spill cleanup effort was undertaken at PCB-6. No soil samples were collected during the SCOU RI because the site had been closed in accordance with applicable TSCA requirements. A complete presentation of RI activities/results for the PCB-6 site is provided in Section 7.2.37 of the *SCOU RI/FS* (JEG, 1997a).

PCB-6 had originally been included in the SCOU ROD Part 1 as a NFA site. However, based on comments received from the DTSC on the SCOU ROD Part 1 regarding the adequacy of site characterization relative to CERCLA decision criteria, additional investigation was conducted at PCB-6 in accordance with an approved work plan (JEG, 2002e). The sampling methodology was based upon U.S. EPA guidance (U.S. EPA, 1986). A total of 3 wipe samples and 8 soil borings were advanced. The wipe samples were collected from the locations of previous PCB detections, including the maximum detection of 9 mg/kg. The soil borings were advanced beneath the asphalt in the power production yard at the location of a reported transformer oil spill. No PCB contamination was detected (JEG, 2002f).

Characterization sampling was conducted at PCB-6 in accordance with the *Project Activities Work Plan* (JEG, 2002f) approved by the BCT. Results of characterization sampling indicate that no PCB contamination is present in excess of Castle Airport RAOs. Therefore, PCB-6 does not pose an adverse risk to human health or the environment. The investigation summary detailing the confirmation sampling results, and recommending NFA for PCB-6, was approved by the BCT (JEG, 2002h).

Human Health Risk Assessment

The maximum cumulative residential risk was 1×10^{-5}. PCB concentrations (9 mg/kg) in soil exceeded the HHRA RAO (0.21 mg/kg), and thus represented adverse risk to human health.

Human Health Risk Management

The risk value of 1×10^{-5} was computed using sampling data collected from the spill area in 1982 (U.S. EPA, 1998a). However, additional sampling performed in 2002 within the building and the spill area, including the location of the previous detection, did not detect any PCB contamination. Therefore, PCB-6 does not pose an adverse risk to human health.

Environmental Assessment

No contaminants are present in excess of WQSA thresholds. Thus, PCB-6 does not pose an adverse risk to groundwater quality.

Site COCs and RAOs

No COCs representing adverse risk to human health or groundwater quality are present at PCB-6.

Selected Remedy

Confirmation sampling results verify that RAOs are not exceeded at PCB-6. Therefore, PCB-6 does not pose an adverse risk to human health or groundwater quality. The selected remedy for PCB-6 is NFA.

2.9 DESCRIPTION OF ALTERNATIVES

Many remedial alternatives were considered during the FS process. The selection of remedial alternatives was based on the different types, concentrations, and the distribution of contaminants found at the SCOU sites. Remedial alternatives included treatment and removal methods. Institutional controls (ICs) and NFA were also considered as required under CERCLA.

Treatment methods considered during the FS included land treatment units (LTUs), bioventing, SVE (vapor treatment via oxidation or carbon adsorption), thermally enhanced SVE, and intrinsic remediation.

Removal methods included SVE (removal of contaminants from soil and soil gas), excavation and disposal. Treatment and removal methods are outlined below:

SVE

- Vapors are extracted using applied vacuum at subsurface wells.
- Volatile contaminants are removed from the subsurface as vapor.
- Air from the atmosphere is drawn into the subsurface, significantly increasing oxygen levels to promote biodegradation.
- Primary equipment includes blowers, wells, conveyance piping, valves, and treatment components.
- Wells and system effluent are sampled and monitored regularly.
- Contaminated vapors are treated at the surface; at the SCOU ROD Part 2 sites, the vapors will be treated using carbon adsorption. The spent carbon filters will be disposed of off-site.
- Operation and maintenance (O&M) activities consist of equipment servicing and optimization of subsurface flow by manipulating system valves.

Thermally Enhanced SVE

- SVE is enhanced by applying heated air or steam to the subsurface to enhance volatilization of contaminants.

Bioventing

- Oxygen is introduced to the subsurface, typically by air injection, but also accomplished by vapor extraction.
- Increased oxygen promotes biodegradation of contaminants (primarily non-halogenated compounds such as fuels).
- Wells are sampled and monitored regularly.
- Primary equipment includes blowers, wells, valves, and conveyance piping.

LTUs

- Air, nutrients, or water are added to excavated soil, as necessary, to promote biodegradation of contaminants (primarily non-halogenated compounds such as fuels).
- Primary equipment includes earthmoving machinery.

Intrinsic Remediation

- Natural processes of attenuation and biodegradation reduce concentrations of contaminants; time required for adequate contaminant reduction may be prohibitively long.

- Long-term monitoring is required.

Excavation and Disposal

- Contaminated soils are excavated and disposed offsite.

- Confirmatory soil samples are collected from the excavation bottom and sidewalls.

- Primary equipment includes earthmoving machinery.

In addition to treatment and removal methods, NFA and ICs were also considered. Descriptions of NFA and ICs are provided below.

NFA

No active remedial alternative is implemented. Long-term monitoring is conducted to measure continued impact to groundwater.

Institutional Controls

No active remedial alternative is implemented. Legal restrictions limit reuse of the property in order to protect against potential threats to human health.

Table 2-11 provides a brief description of the alternatives considered for the SCOU ROD Part 2 sites. Section 2.14 discusses any subsequent changes from the selected remedies in the *SCOU Revised Proposed Plan.*

Table 2-11 Summary of SCOU ROD 2 Remedial Alternatives

(Page 1 of 2)

ALTERNATIVE TREATMENT	DESCRIPTION
Landfarming Land Treatment Unit (LTU)	Landfarming is usually used to treat surface soil impacted by non-halogenated VOCs and fuel hydrocarbons. The method also may be applicable for some halogenated VOCs and SVOCs, non-halogenated SVOCs, and pesticides. This method involves periodically tilling or turning over contaminated soil in place. Moisture and nutrients can be applied as needed to promote biodegradation.
Biopile Land Treatment Unit (LTU)	Biopile is a type of LTU that is applicable for non-halogenated VOCs and fuel hydrocarbons. It may also be effective for some halogenated VOCs and SVOCs, non-halogenated SVOCs, and pesticides. Biopile involves excavating contaminated soil from the ground, mixing it with nutrients, and placing the soil on an aboveground pad that includes a leachate collection system. Remediation is achieved through biodegradation and aeration processes.
Bioventing	Bioventing is applicable for soil contaminated with non-halogenated VOCs, SVOCs, and fuel hydrocarbons. Degradation of halogenated VOCs, SVOCs, and pesticides is possible. Bioventing involves forcing air through contaminated soils. This process increases oxygen content of soil and promotes biodegradation. Bioventing is enacted after SVE operations are completed, and utilizes the SVE extraction well network.
Soil Vapor Extraction (SVE)	SVE is applicable for VOCs and fuel hydrocarbon-contaminated soils. SVE involves applying a vacuum to enhance volatilization and physically removing contaminants from the vadose zone. The vacuum is applied through a network of extraction wells. Off-gases may need to be treated to remove contaminants. The type of off-gas treatment is dependent on the type of contaminants being remediated. Treatment alternatives include granular activated carbon (GAC), catalytic or thermal oxidation, or catalytic scrubbing.
Thermally Enhanced SVE	This method is applicable for soils impacted by halogenated and non-halogenated SVOCs that are not easily removed using conventional SVE. Steam or hot air is injected into contaminated soil to increase the mobility of organic compounds and facilitate extraction. Off gases may require treatment to remove contaminants. The type of off-gas treatment is dependent on the type of contaminants being remediated. Treatment alternatives include GAC, catalytic or thermal oxidation, or catalytic scrubbing.

Table 2-11. Summary of SCOU ROD 2 Remedial Alternatives
(Page 2 of 2)

TREATMENT (cont.)	
Intrinsic Remediation (IR)	IR is applicable for soils contaminated with non-halogenated VOCs, SVOCs, and petroleum hydrocarbons. Degradation of some halogenated VOCs, SVOCs, and pesticides is also possible. IR relies on natural processes within the soil to achieve remediation goals. These processes include attenuation, chemical transformation, and biodegradation. Prior to enacting IR, a feasibility study is required to determine if IR is appropriate for a site.
REMOVAL	
Excavation and Disposal	Soil is excavated and temporarily stockpiled. The stockpiled soil is characterized as hazardous or nonhazardous, and disposed of at an appropriate off-site landfill.
INSTITUTIONAL CONTROLS (ICs)	
Deed Restriction and Land Use Covenant (LUC)	The ICs alternative consists of ICs and land use covenants (ICs/LUCs). ICs are legal controls restricting the use of property as well as warning of hazards or warning of site limitations. ICs serve to prevent exposure of contaminants to future landowner(s) and/or user(s).
NO ACTION	
No Further Action	The no further action alternative was considered for each SCOU site included in the FS. Under no further action, groundwater sampling and analyses is undertaken to monitor groundwater conditions related to the site. This is accomplished through the long-term basewide monitoring program. No other remedial actions are undertaken to cleanup the site or restrict access.

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives considered for cleaning up Superfund sites are required to be compared using remedial evaluation criteria found in the U.S. EPA NCP. Explanations of the U.S. EPA evaluation criteria are provided in Table 2-12. These criteria are subdivided into three groups: threshold criteria, balancing criteria, and modifying criteria. Threshold and balancing criteria were evaluated during the FS. Modifying criteria were considered after comments on the *SCOU Revised Proposed Plan* were received and given an appropriate response. In order to satisfy the threshold criteria, the remedial alternative must:

- Be protective of human health and the environment
- Comply with applicable or relevant and appropriate requirements (ARARs).

As several different remedial alternatives may satisfy the threshold criteria, the selected alternatives are then compared based on the following balancing criteria:

- Long-term effectiveness
- Contaminant toxicity, mobility, or volume reduction
- Short-term effectiveness
- Implementability
- Cost.

Implementing the balancing criteria will generally indicate a technically and economically preferable alternative. However, in many cases the apparent preference for one alternative over another may not be significant. Also, the most technically and economically preferred alternative may have other drawbacks. In these instances, modifying criteria are used to distinguish among alternatives that are otherwise closely ranked.

The modifying criteria are:

- State acceptance
- Community acceptance.

Table 2-12 U.S. EPA Evaluation Criteria

THRESHOLD CRITERIA

Overall Protection of Human Health and the Environment - Addresses whether or not a cleanup option provides adequate protection and describes how risks, posed through each pathway, are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with Applicable or Relevant and Appropriate Requirements – Addresses whether a cleanup option will meet all ARARs and/or provide grounds for invoking a waiver.

BALANCING CRITERIA

Long-Term Effectiveness or Permanence - Refers to the ability of a cleanup option to maintain reliable protection of human health and the environment, over time, once cleanup goals (i.e. remedial action objectives) have been met.

Reduction of Toxicity, Mobility, and Volume through Treatment - Refers to the anticipated ability of a cleanup option to reduce the toxicity, mobility, and volume of the hazardous components present at the site.

Short-Term Effectiveness - Addresses the period of time needed to complete the cleanup option, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals (i.e. remedial action objectives) are achieved.

Implementability - Refers to the technical and administrative feasibility of a cleanup option, including the availability of materials and services needed to carry out a particular option.

Cost - Refers to the estimated capital and operation and maintenance costs of each option.

MODIFYING CRITERIA

State Acceptance - indicates whether, based on its review of the information, the state concurs with, opposes to, or has no comment on the preferred cleanup options.

Community Acceptance - Indicates whether community concerns are addressed by the cleanup option and whether or not the community has a preference for a cleanup option.

Tables 2-13 and 2-14 summarize the alternatives considered for the VOC sites and waste oil tank and OWS sites, respectively. A comparative ranking is assigned to each alternative considered based upon compliance with the nine evaluation criteria. The rankings are derived from the detailed comparative analysis performed in the *SCOU RI/FS* (JEG, 1997a).

2.10.1 VOC Sites

Alternatives considered for the VOC sites included NFA, ICs, LTUs, bioventing, SVE, thermally enhanced SVE, and intrinsic remediation.

NFA would not be protective of human health and the environment, and would not comply with ARARs. ICs would protect human health, but would not protect the environment or comply with ARARs. LTUs, bioventing, and intrinsic remediation are generally not applicable to halogenated compounds, thus would not be protective of human health or the environment, nor would result in compliance with ARARs.

SVE and thermally enhanced SVE would be protective of human health and the environment, would comply with ARARs, and would provide a prompt and permanent reduction in contaminant toxicity and mass. However, SVE is considerably more cost-effective and easier to implement than thermally enhanced SVE. Additionally, SVE is a proven and widely used remedial technology, thus facilitating state and community acceptance.

SVE yielded the best ranking based upon the comparative analysis of remedial alternatives for the VOC sites.

2.10.2 Waste Oil Tank and OWS Sites

Alternatives considered for the waste oil tank and OWS sites included NFA, ICs, LTUs, bioventing, SVE, thermally enhanced SVE, intrinsic remediation and excavation and disposal.

NFA would not be protective of human health and the environment, and would not comply with ARARs. ICs would protect human health, but would not protect the environment or comply with ARARs. LTUs, bioventing, SVE, thermally enhanced SVE, and intrinsic remediation would satisfy

Table 2-13 Comparative Analysis of VOC Sites

Alternative	EPA Evaluation Criteria									Score	Ranking
	Overall Protection of Human Health and the Environment	Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)	Long-Term Effectiveness or Permanence	Reduction of Toxicity, Mobility, and Volume through Treatment	Short-Term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance		
No Further Action (NFA)	7	7	7	7	7	1	1	7	7	51	7
Institutional Controls (ICs)	6	6	6	6	6	2	2	6	6	46	6
Soil Vapor Extraction (SVE)	1	1	1	1	1	4	5	1	1	16	1
Thermally Enhanced SVE	2	1	1	1	1	5	5	1	1	18	2
Bioventing	2	3	3	3	3	6	5	2	2	29	3
Land Treatment Unit (LTU)	4	4	3	3	4	7	4	3	3	35	5
Intrinsic Remediation	4	4	5	3	4	3	3	3	3	32	4

Notes:

Rankings from best to worst: best = 1.

Rankings are derived from the *SCOU RI/FS Report* (JEG, 1997a)

Table 2-14 Comparative Analysis of Waste Oil Tank and OWS Sites

Alternative	EPA Evaluation Criteria									Score	Ranking
	Overall Protection of Human Health and the Environment	Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)	Long-Term Effectiveness or Permanence	Reduction of Toxicity, Mobility, and Volume through Treatment	Short-Term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance		
No Further Action (NFA)	8	8	8	8	8	1	1	8	8	58	8
Institutional Controls (ICs)	7	7	7	7	7	2	2	7	7	53	7
Soil Vapor Extraction (SVE)	3	2	2	2	3	4	5	2	2	25	2
Thermally Enhanced SVE	3	2	2	2	3	5	5	2	2	26	3
Bioventing	3	5	2	2	3	4	5	2	2	28	4
Land Treatment Unit (LTU)	3	6	2	2	6	4	4	2	2	31	6
Excavation and Disposal	1	1	1	1	1	4	5	1	1	16	1
Intrinsic Remediation	2	2	2	2	2	3	3	6	6	28	4

Notes:

Rankings from best to worst: best = 1.

Rankings are derived from the *SCOU RI/FS* (JEG, 1997a) the nine criteria for all but one of the waste oil tank and OWS sites (LTUs, bioventing, or intrinsic remediation would not be applicable for the halogenated VOCs at B1541). However, for shallow contamination, excavation is quick, thorough, permanent, easily implemented, and cost-effective. In addition, the sites included tanks or OWSs that were removed via excavation in accordance with the CAFB tank and OWS removal program, implemented as Air Force policy upon base decommissioning.

Excavation and disposal yielded the best ranking based upon the comparative analysis of remedial alternatives for the waste oil tank and OWS sites.

2.11 PRINCIPAL THREAT WASTE

2.11.1 VOC SITES

In general, concentrations of TCE, PCE, cis-1,2-DCE, benzene, TVPH, and TEPH in soil and soil gas at the VOC sites constitute a principal threat to groundwater. No contaminants are present at concentrations that constitute an adverse threat to human health.

2.11.2 WASTE OIL TANK AND OWS SITES

TVPH and TEPH in soil at SWMUs 4.3, 4.4, and 4.21 constitute a principal threat to groundwater. TEPH in soil at SWMU 4.16 constitutes a principal threat to groundwater. Principal threat wastes at SWMUs 4.6 and 4.22 are the potential SVOC, VOC or metal contaminants that may pose a threat to human health and/or groundwater in soil below the OWS units. Confirmation sampling is planned at SWMUs 4.6 and 4.22 to identify the presence of COCs and principal threat wastes.

2.12 SELECTED REMEDY

2.12.1 VOC SITES

The selected remedy for the VOC sites is SVE. Supplemental excavation, bioventing and intrinsic remediation will be conducted at DA-5 (which includes SWMUs 4.3 and 4.21), and supplemental excavation will be performed at DA-4. Supplemental soil excavation at DA-4 and DA-5 is appropriate to further reduce the COC concentrations in soil to meet the established RAOs. The RAOs for soil excavation at DA-4 and DA-5 are established in Sections 2.8.1.6 and 2.8.1.7, respectively. SVE is appropriate because it is a proven method for the removal and treatment of VOCs in soil and soil gas. SVE is the option that best addresses the evaluation criteria described in subsection 2.10. Table 2-15 provides descriptions of U.S. EPA evaluation criteria pertaining to SVE at the VOC sites.

SVE involves the application of a vacuum to enhance volatilization and physically remove VOCs from the vadose zone. The vacuum is applied through a network of extraction wells and conveyance piping. Locations and depths of the extraction wells are based upon the distribution of contaminants and the type of subsurface sediments. Sandy soils yield abundant vapor flow and require fewer wells, whereas clayey soils yield less flow and require more wells. Extracted vapors require treatment to remove contaminants. Treatment will be provided using granulated activated carbon (GAC) filters. The GAC will be contained in closed vessels with an inlet that leads to the extraction well vacuum network and an outlet that is vented to the atmosphere. Spent carbon will be disposed of or regenerated offsite.

The SVE will result in increased subsurface oxygen concentrations, thereby stimulating intrinsic remediation of residual petroleum hydrocarbons. Upon completion of SVE and shallow excavations at DA-5 (including SWMUs 4.3 and 4.21), intrinsic remediation may be observed to assess its applicability of reducing TEPH concentrations in lieu of excavation or bioventing.

SVE will directly remove TCE, PCE, cis-1,2-DCE, 1,4-dichlorobenzene, benzene, TVPH, many components of TEPH, and any other VOCs present within the soil and soil gas. Bioventing and intrinsic remediation will reduce concentrations of the nonvolatile components of TEPH. Thus, implementation of the selected remedy will reduce contaminant concentrations to levels that no longer constitute a principal threat to human health or groundwater, allowing for unrestricted land reuse.

Where SVE systems are currently operating or will be operating in the future, the Air Force will either retain ownership of the property until the systems have ceased to operate and a final closure report has been approved by the agencies, or will adopt suitable institutional controls that protect building residents and the operating systems until closure is achieved.

2.12.2 Waste Oil Tank and OWS Sites

The selected remedy for the waste oil tank and OWS sites is excavation and off-site disposal. Supplemental bioventing will be performed at SWMUs 4.3 and 4.21. Table 2-16 provides descriptions of U.S. EPA evaluation criteria pertaining to excavation and off-site disposal at the waste oil tank and OWS sites. Excavation and off-site disposal consists of excavating the soil and temporarily stockpiling it at a single consolidation location. The stockpiled soil is then characterized as hazardous or nonhazardous, and disposed of at an appropriate off-site facility. Soil samples are collected from the bottom and sidewalls of the excavation in order to confirm removal of contaminants below RAOs.

Excavation and disposal will reduce contaminant concentrations to levels that no longer constitute a principal threat to human health or groundwater, allowing for unrestricted land reuse.

2.12.3 NO FURTHER ACTION SITES

NFA is the selected remedy for the No Further Action Sites. Sampling results confirm that contaminants are not present at concentrations representing a principal threat to human health or groundwater quality. NFA will allow for unrestricted land reuse.

Table 2-15 Evaluation of Selected Remedy, VOC Sites
(Page 1 of 4)

Selected Remedy	Soil Vapor Extraction (21 Sites)		
Site Name	B51 Group (with supplemental bioventing and/or excavation)	B54 Group (with supplemental bioventing)	Discharge Area (DA)-4
Site Coordinates (Plate 1)	R11	R12	K8
Associated SCOU Sites With Same Selected Remedy	Buildings 52, 53, 1253	Buildings 1260, 1266, ETC5, SA B3, Structures 55, T66, T67	Building 1314
Evaluation Criteria			
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.
ARAR Compliance	Remedy will comply with ARARs.	Remedy will comply with ARARs	Remedy will comply with ARARs.
Long-Term Effectiveness	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.
Reduction of Toxicity, Mobility, or Volume	Significantly reduces the volume of contaminants in soil.	Significantly reduces the volume of contaminants in soil.	Significantly reduces the volume of contaminants in soil.
Short-Term Effectiveness	Expected duration of SVE treatment is 18 months[1]. Does not present a substantial risk to on-site workers or the community.	Expected duration of SVE treatment is 24 months[1]. Does not present a substantial risk to on-site workers or the community.	Expected duration of SVE treatment is 5 months[1]. Does not present a substantial risk to on-site workers or the community.
Implementability	Commercially available and has been used successfully at numerous NPL sites.	Commercially available and has been used successfully at numerous NPL sites.	Commercially available and has been used successfully numerous NPL sites.
Capital Costs Operation and Maintenance Total Cost (present worth)	\$359,000 \$844,000 \$1,203,000[1]	\$951,000 \$2,058,000 \$3,009,000[1]	\$344,000 \$172,000 \$516,000[1]

Table 2-15 Evaluation of Selected Remedy, VOC Sites
(Page 2 of 4)

Selected Remedy	Soil Vapor Extraction (22 Sites)		
Site Name	Building 1350 (with supplemental bioventing)	Building 1762	Discharge Area (DA)-5 (with supplemental bioventing and/or excavation)
Site Coordinates (Plate 1)	Q12	K13	Q13
Associated SCOU Sites With Same Remedy	None	None	None
Evaluation Criteria			
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing soil levels.
ARAR Compliance	Remedy will comply with ARARs	Remedy will comply with ARARs.	Remedy will comply with ARARs.
Long-Term Effectiveness	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.
Reduction of Toxicity, Mobility, or Volume	Significantly reduces the volume of contaminants in soil.	Significantly reduces the volume of contaminants in soil.	Significantly reduces the volume of contaminants in soil.
Short-Term Effectiveness	Expected duration of SVE treatment is 8 months[1]. Does not present a substantial risk to on-site workers or the community.	Expected duration of SVE treatment is 12 months[1]. Does not present a substantial risk to on-site workers or the community.	Expected duration of SVE treatment is 6 months[1]. Does not present a substantial risk to on-site workers or the community.
Implementability	Commercially available and has been used successfully at numerous NPL sites.	Commercially available and has been used successfully numerous NPL sites.	Commercially available and has been used successfully at numerous NPL sites.
Capital Costs Operation and Maintenance Total Cost (present worth)	\$234,000 \$204,000 \$438,000[1]	\$335,000 \$366,000 \$701,000[1]	\$140,000 \$89,000 \$229,000[1]

Table 2-15 Evaluation of Selected Remedy, VOC Sites
(Page 3 of 4)

Selected Remedy	Soil Vapor Extraction (21 Sites)	
Site Name	Hangar F-4	Building 1709
Site Coordinates (Plate 1)	Q11	L13
Associated SCOU Sites With Same Selected Remedy	No associated SCOU sites.	No associated SCOU sites.
Evaluation Criteria		
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.
ARAR Compliance	Remedy will comply with ARARs.	Remedy will comply with ARARs.
Long-Term Effectiveness	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.
Reduction of Toxicity, Mobility, or Volume	Significantly reduces the volume of contaminants in soil.	Significantly reduces the volume of contaminants in soil.
Short-Term Effectiveness	Expected duration of SVE treatment is 18 months[2]. Does not present a substantial risk to on-site workers or the community.	Expected duration of SVE treatment is 7 months[2]. Does not present a substantial risk to on-site workers or the community.
Implementability	Commercially available and has been used successfully at numerous NPL sites.	Commercially available and has been used successfully numerous NPL sites.
Total Cost	$75,000[2]	$50,000[2]

Table 2-15 Evaluation of Selected Remedy, VOC Sites
(Page 4 of 4)

Selected Remedy	Soil Vapor Extraction (21 Sites)	
Site Name	Sanitary Sewer 2	Sanitary Sewer 4
Site Coordinates (Plate 1)	Q10	R12
Associated SCOU Sites With Same Selected Remedy	No associated SCOU sites.	No associated SCOU sites.
Evaluation Criteria		
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.
ARAR Compliance	Remedy will comply with ARARs	Remedy will comply with ARARs.
Long-Term Effectiveness	Effective in removing contaminants from soil.	Effective in removing contaminants from soil.
Reduction of Toxicity, Mobility, or Volume	Significantly reduces the volume of contaminants in soil.	Significantly reduces the mass of contaminants in soil.
Short-Term Effectiveness	Expected duration of SVE treatment is 12 months[2]. Does not present a substantial risk to on-site workers or the community.	Does not present a substantial risk to on-site workers or the community (incorporated into the B51/54 removal action SVE system for which the anticipated duration is 18-24 months).
Implementability	Commercially available and has been used successfully at numerous NPL sites.	Commercially available and has been used successfully numerous NPL sites.
Total Cost	$50,000[2]	Results of the SVE decision study confirm SS-4 contamination is contiguous with B51. Cost to remediate B51 includes SS-4.

1 Cost estimate and duration were provided in the FS. The cost estimate was generated using a discount rate of 5%.
2 Cost and duration are based on Air Force-awarded contracts.

Table 2-16 Evaluation of Selected Remedy, Waste Oil Tank and OWS Sites
(page 1 of 2)

Selected Remedy	Excavation and Disposal (6 Sites)		
Site Name	SWMU 4.3	SWMU 4.4	SWMU 4.6
Site Coordinates (Plate 1)	P9	P10	R12
Associated SCOU Sites With Same Selected Remedy	No associated SCOU sites.	No associated SCOU sites.	No associated SCOU sites.
Evaluation Criteria			
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.
ARAR Compliance	Remedy will comply with ARARs.	Remedy will comply with ARARs	Remedy will comply with ARARs.
Long-Term Effectiveness	Removal will be permanent and very effective.	Removal will be permanent and very effective.	Removal will be permanent and very effective.
Reduction of Toxicity, Mobility, or Volume	Permanent reduction of toxicity, mobility, or volume.	Permanent reduction of toxicity, mobility, or volume.	Permanent reduction of toxicity, mobility, or volume.
Short-Term Effectiveness	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.
Implementability	No limitations.	No limitations.	No limitations.
Total Cost[1]	$150,000	$125,000	$175,000

Table 2-16. Evaluation of Selected Remedy, Waste Oil Tank and OWS Sites
(page 2 of 2)

Selected Remedy	Excavation and Disposal (6 Sites)		
Site Name	SWMU 4.16	SWMU 4.21	SWMU 4.22
Site Coordinates (Plate 1)	R12	Q13	S13
Associated SCOU Sites With Same Selected Remedy	No associated SCOU sites.	No associated SCOU sites.	No associated SCOU sites.
Evaluation Criteria			
Overall Protectiveness	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.	Protective of human health and the environment by reducing contaminant levels in soil.
ARAR Compliance	Remedy will comply with ARARs.	Remedy will comply with ARARs	Remedy will comply with ARARs.
Long-Term Effectiveness	Removal will be permanent and very effective.	Removal will be permanent and very effective.	Removal will be permanent and very effective.
Reduction of Toxicity, Mobility, or Volume	Permanent reduction of toxicity, mobility, or volume.	Permanent reduction of toxicity, mobility, or volume.	Permanent reduction of toxicity, mobility, or volume.
Short-Term Effectiveness	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.	Expected duration of 6 to 12 months. Risks to workers controlled through protective equipment.
Implementability	No limitations.	No limitations.	No limitations.
Total Cost[1]	$150,000	$280,000	$125,000

[1] Represents the sum of costs to date and cost to complete as tracked and estimated in the AFRPA's Environmental Program.

2.13 STATUTORY DETERMINATIONS

Per the statutory requirements of CERCLA Section 121, the selected remedies for the VOC sites and waste oil tank and OWS sites will adequately protect human health, will comply with ARARs, are cost-effective, and utilize permanent solutions to the maximum extent practicable. The selected remedy for the VOC sites utilizes treatment as a principal element. Excavation and disposal was selected for the waste oil tank and OWS sites rather than treatment because the COCs are shallow and distributed within the vicinity of waste oil tanks and OWSs previously designated for removal according to the CAFB tank and OWS removal program. The selected remedies will result in the following:

- Existing or potential risks posed by the sites through each pathway will be eliminated, reduced, or controlled by the response action
- Exposure levels will be reduced to protective ARAR levels or to within U.S. EPA's risk management range of 10^{-4} to 10^{-6} for carcinogenic risk and below the hazard index of 1.0 for noncarcinogens
- Implementation of the selected remedies will not pose unacceptable short-term risks or cross-media impacts
- The remedies provide adequate protection of the environment.

ARARs and requirements of the five-year review process are described in the following subsections.

2.13.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA requires that remedial actions conform to all ARARs promulgated under state and federal environmental or facility siting laws. ARARs may be chemical-specific, location-specific, or action-specific in nature. Pursuant to the NCP, the Air Force requests at several stages in the cleanup process that the relevant state and federal regulators provide their proposed ARARs for the particular cleanup. The Air Force and the regulators then come to an agreement on the substantive requirements that apply to the cleanup.

The State of California has identified *State Water Resources Control Board Resolutions 68-16* and *92-49* and the *Policy for Investigation and Cleanup of Contaminated Sites* contained in the *Central Valley Regional Water Quality Control Board, Water Quality Control Plan (Basin Plan)* for the Sacramento River and San Joaquin River Basins as proposed ARARs for determining cleanup levels for VOCs in the vadose zone at CAFB. The USAF and State disagree about whether those state requirements are ARARs for this cleanup. With respect to *Resolution 68-16*, the State asserts that discharges subject to the resolution include the continuing migration of in-situ contamination from the vadose zone to groundwater. Under *Resolution 68-16,* some degradation may be allowed so long as the cleanup action applies best practicable treatment or control to prevent further migration of waste to waters of the state at levels that exceed the water quality objectives or impact beneficial uses. With respect to *Resolution 92-49*, the State asserts that it is an applicable requirement for remedial actions of the vadose zone where the waste either discharges to or threatens to discharge to waters of the State. In such a case, *Resolution 92-49* requires remediation of the vadose zone to the lowest concentration levels of constituents technically and economically feasible, which must at least protect the beneficial uses of groundwater and surface water, but need not be more stringent than is necessary to achieve background levels of the constituents in surface water and groundwater. With respect to the *Basin Plan*, the Regional Water Board asserts that the cleanup policy applies to determining the appropriate cleanup level in the vadose zone that will comply with *Resolution 68-16* and *Resolution 92-49* and will meet the water quality objectives in the *Basin Plan* and protect the beneficial uses.

The State agrees that the cleanup objective of the "lowest levels technically and economically feasible", in conjunction with the application of the Castle AFB STOP criteria, as proposed, will provide substantive compliance with *Resolution 68-16*, *Resolution 92-49*, and the *Basin Plan* and, therefore, will not object if the Air Force does not identify those requirements as ARARs in the ROD. The response actions are in the best interests of the people of the State. The criteria are intended to result in cleanup to the lowest level that is economically and technically feasible and that will protect the beneficial uses of the waters of the state. The State also believes that State Water Resources Control Board Resolution 88-63 is applicable, rather than relevant and appropriate, to these cleanups, but will not object if the Air Force identifies it as relevant and appropriate in this ROD. The State believes that the Air Force is properly implementing Resolution 88-63 in the soil cleanups described in this ROD.

There are no chemical-specific ARARs identified for contaminated soils. Potential location-specific ARARs include those associated with federal and state endangered and threatened species that may be affected by the remedial actions. Final determination of the location-specific ARARs will be documented in the CB ROD Part 2. Action-specific ARARs for SVE and excavation/off-site disposal include:

- Federal and California hazardous waste requirements for identification, on-site temporary storage, and off-site treatment and disposal of hazardous remediation wastes, including contaminated soil, debris, and wastes generated during site excavation or well installation
- National Pollution Discharge Elimination System (NPDES) storm water discharge requirements for runoff generated during soil excavation work
- Federal, state and local clean air act requirements for particulate and gaseous emissions in non-attainment areas during the remedial activities.

2.13.1.1 Location-specific ARARs

The location-specific ARARs for the SCOU ROD Part 2 contaminated soils consist of requirements for the protection of federally and state listed endangered species. Based on the findings of the *Environmental Impact Statement* (Earth Tech, 1994), Buildings 1762 and 1709 are located adjacent to the boundary of the vernal pool fairy shrimp habitat. The vernal pool fairy shrimp is listed as threatened by the U.S. Fish and Wildlife Service. The Federal Endangered Species Act requires that the disturbance of this habitat must be avoided during the SVE system construction and operations. Additionally, because there is a possibility that a state-listed species occurs on or in the vicinity of Buildings 1762 and 1709, the California Endangered Species Act, California Fish and Game Code, 14 CCR 2050; 14 CCR 1990; and 14 CCR 3005 are potentially applicable. The final applicability determination will be made during the CB ROD Part 2.

2.13.1.2 Action-specific ARARs

Action-specific ARARs are technology-based or activity-based requirements or limitations on remedial actions. While on-site actions must comply with all substantive requirements (ARARs), off-site actions must comply with all applicable requirements, including administrative requirements. Because the SVE and the excavation and off-site disposal sites will involve similar site intrusive activities (i.e., soil excavation, drilling, and SVE well installation) and similar site contaminants, they share many of the same waste management, wastewater discharge, and air emissions ARARs. Federal, state, and local ARARs for the selected remedial actions at the SCOU ROD 2 sites are listed on Table 2-17. The ARARs were identified based upon U.S. EPA guidance (U.S. EPA, 1998b).

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Site Cleanup Regulations That Protect Water Quality				
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240)	State Water Resources Control Board Resolution No. 88-63 ("Sources of Drinking Water Policy") (as contained in the RWQCB's Water Quality Control Plan)	Relevant and Appropriate	Specifies that, with certain exceptions, all ground and surface waters have the beneficial use of municipal or domestic water supply.	Applies in determining beneficial uses for waters that may be affected by dischargers of waste.

Table 2-17
Applicable or Relevant and Appropriate Requirements

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Federal and State Waste Regulations				
Federal 40 CFR 261.3 (Also see California 22 CCR 66261 below)	Definition of Hazardous Waste as Applied to Remediation Wastes	Applicable or Relevant and Appropriate to SCOU ROD Part 2 (excavation/off-site disposal and SVE) sites where remediation wastes (e.g., spent granular activated carbon, excavated soil, debris, drill cuttings, decontamination liquids, and disposable equipment) will be generated. Contaminated soils that remain in the ground are not wastes and therefore not subject to these regulations.	Identifies those wastes that are subject to regulation as hazardous wastes. Excavated contaminated soil must be classified using generator knowledge or waste analysis. If, based on generator knowledge, the soil contains a listed hazardous waste, then the soil is considered hazardous based on EPA's "contained-in policy." If, based on waste analysis, the soil fails the RCRA characteristic test, the soil is considered hazardous. In both instances, the hazardous soil must be managed as hazardous waste and the soil must be treated, stored, disposed of in accordance with the RCRA regulations that are listed below.	In this site, the Air Force has no definitive knowledge that the soil contains a listed hazardous waste. Nevertheless, in certain circumstances, such as when the COC or detected concentration in the soil is similar to a listed hazardous waste, the Air Force may consider the EPA contained-in policy relevant and appropriate. Where it is relevant and appropriate, the Air Force will comply with the relevant and appropriate RCRA treatment and storage requirements. Although not technically an ARAR because it applies to an activity offsite, the Air Force will comply with the offsite rule in disposing of the soil offsite.

Table 2-17
Applicable or Relevant and Appropriate Requirements

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California 22 CCR 66261.3, 66261.24, 66261.30, 66261.100, and 66261.101, Appendices X and XII	Definition of RCRA and Non-RCRA Hazardous Waste	Applicable or Relevant and Appropriate to the classification of remediation wastes generated at SCOU ROD Part 2 sites where excavation/off-site disposal and SVE are the selected alternatives.	Identifies those wastes that are subject to regulation as hazardous wastes. Excavated contaminated soil must be classified using generator knowledge or waste analysis. If, based on generator knowledge, the soil contains a listed hazardous waste, then the soil is considered hazardous based on EPA's "contained-in policy." If, based on waste analysis, the soil fails the RCRA characteristic test, the soil is considered hazardous. In both instances, the hazardous soil must be managed as hazardous waste and the soil must be treated, stored, disposed of in accordance with the RCRA regulations that are listed below.	In this site, the Air Force has no definitive knowledge that the soil contains a listed hazardous waste. Nevertheless, in certain circumstances, such as when the COC or detected concentration in the soil is similar to a listed hazardous waste, the Air Force may consider the EPA contained-in policy relevant and appropriate. Where it is relevant and appropriate, the Air Force will comply with the relevant and appropriate RCRA treatment and storage requirements. Although not technically an ARAR because it applies to an activity offsite, the Air Force will comply with the offsite rule in disposing of the soil offsite.
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147 13172, 13260, 13263, 13269).	Title 27, CCR, Section, 20200(c), 20210	Applicable	Requires that designated waste be discharged to Class I or Class II waste management units.	Applies to discharges of designated waste (nonhazardous waste that could cause degradation of surface or ground waters) to land for treatment, storage, or disposal.

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147 13172, 13260, 13263, 13269).	Title 27, CCR, Section 20230	Applicable	Requires that inert waste does not need to be discharged at classified units.	Applies to discharges of inert waste to land for treatment, storage, or disposal.
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13269).	Title 27, CCR, Section 20200(c),20220	Applicable	Requires that nonhazardous solid waste be discharged to a classified waste management unit.	Applies to discharges of nonhazardous solid waste to land for treatment, storage, or disposal.
California 27 CCR 20200	Definition of Nonhazardous Wastes	Applicable to excavated soil	Excavated soil will be classified and handled in accordance with this regulation. Contaminated soils that remain in the ground are not considered wastes and therefore are not subject to the waste classification requirements.	Wastes that are determined to be nonhazardous may be disposed of at any classified landfill (i.e., Class I, II, or III) that is authorized to accept such waste (27 CCR 20200). Special requirements and restrictions apply to the disposal of liquid wastes. Nonhazardous solid wastes may also be inert wastes if they do not contain hazardous or decomposable wastes or soluble pollutants at concentrations exceeding applicable water quality objectives. Inert wastes do not have to be disposed of at classified landfills.

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California 23 CCR 13173	Definition of Designated Wastes	Applicable to excavated soil	Designated wastes are either exempted hazardous wastes or nonhazardous wastes that contain pollutants at levels that threaten water quality (23 CCR 13173). Designated wastes must be disposed of at Class I or II landfills (27 CCR 20200).	
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Section 20090(d) Title 23 CCR, Section 2511(d)	Applicable	Actions taken by public agencies to cleanup unauthorized releases are exempt from title 27/ Title 23 except that wastes removed from immediate place of release and discharged to land must be managed in accordance with classification (Title 27 CCR, Section 20200/ Title 23 CCR, Sections 2520) and siting requirements of Title 27 or Title 23. Wastes contained or left in place must comply with Title 27 or Title 23 to the extent feasible.	Applies to remediation and monitoring of sites.
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 23, CCR, Section 2550.4	Relevant and Appropriate	Concentration limits must be established for groundwater, surface water, and the unsaturated zone. Must be based on background, equal to background, or for corrective actions, may be greater than background, not to exceed the lower of the applicable water quality objective or the concentration technologically or economically achievable. Specific factors must be considered in setting cleanup standards above background levels.	If water quality is threatened, this section applies in setting soil cleanup levels for all cleanups of discharges of waste to land.

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 23, CCR, Section 2550.6	Relevant and Appropriate	Requires monitoring for compliance with remedial action objectives for three years from the date of achieving cleanup levels.	Applies to all soil cleanup activities.
California Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13269).	Title 23, CCR, Section 2550.10	Relevant and Appropriate	Requires implementation of corrective action measures that ensure that cleanup levels (i.e., water quality protection standard established under section 2550.2) are achieved throughout the zone affected by the release by removing the waste constituents or treating them in place. Source control may be required. Also requires monitoring to determine the effectiveness of the corrective actions.	If water quality is threatened, this section applies to all soil cleanup activities.

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Federal 40 CFR 268	Land Disposal Restrictions	Applicable to sites involving off-site treatment and disposal of excavated soils, debris, and other remediation wastes that have hazardous constituent concentrations greater than the treatment standards listed in this section.	LDR Phase IV Final rule (*63 FR 28555-28604*, 5/26/98) requires that that soils be treated by reducing the hazardous constituent levels by ninety percent unless such treatment would result in concentrations that are less than ten times the relevant Universal Treatment Standards (UTS), in which case treatment would be capped at ten times the UTS. Hazardous remediation wastes, (i.e., wastes generated during excavation or during well installation), will be managed in accordance with this requirement. Hazardous debris will be treated in accordance with treatment standards in 40 CFR 264.45, which are based on decontamination technologies listed in this section.	Under federal and state regulations, even those soils and other remediation wastes that are not hazardous are subject to LDRs if the hazardous constituent concentrations are greater than the treatment standard for that waste type. California has promulgated these federal LDR treatment standards for RCRA hazardous wastes (22 CCR 66268.40-66268.49). See discussion below for non-RCRA hazardous waste treatment standards.
California 22 CCR 66268.107	Land Disposal Restrictions for Non-RCRA Hazardous Metal-containing Aqueous Wastes	Applicable to off-site treatment and disposal of non-RCRA metal containing aqueous wastes that might be generated by decontaminating excavation and drilling equipment.	Table II, Constituent Concentrations in the Wastes, lists treatment standards for aqueous non-RCRA hazardous wastes containing metals. Liquid remediation wastes must be tested using the Cal-WET for these metal constituents and the extract concentrations compared to those listed in Table II of this section. If they exceed the LDR treatment standards, they must be treated off-site prior to disposal.	These are the only applicable non-RCRA waste treatment standards currently promulgated in California. Other applicable non-RCRA hazardous wastes do not have promulgated treatment standards.

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California 22 CCR 66262	Standards for Generators of Hazardous Wastes	The substantive portions of this section are applicable to any hazardous wastes generated during remediation.	Generators must determine whether the wastes are RCRA or non-RCRA hazardous (22 CCR 66262.11). The accumulation time requirements in 22 CCR 66262.34 and 66262.34 are not ARARs to CERCLA AOCs.	These regulations are listed here as ARARs; however, Castle Airport is designated as a hazardous waste generator and therefore already subject to these requirements.

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
State Water Resources Control Board NPDES General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water runoff Associated with Construction Activity				
California State Water Resources Control Board Order 99-08-DWQ	Substantive Management Requirements of Storm Water Discharge Management Requirements	Applicable for construction activities that result in soil disturbances of more than 5 acres.	Must identify the sources of sediment and other pollutants that affect the quality of storm water discharges and implement practices to reduce these discharges. Storm water discharges from construction sites must meet pollutant limits and standards. The SWRCB has not established numeric effluent limitations. The narrative effluent standard includes the requirements to implement Best Available Technology Economically Achievable (BAT) or Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate stormwater pollution. Inspections of the construction site prior to anticipated storm events and after actual storm events need to be conducted to identify areas contributing to storm water discharge and evaluated for the effectiveness of BCTs and other control practices.	The remedial actions at the SCOU sites are being conducted as part of the overall remedial actions for Castle Airport. Excavation, grubbing, clearing, and other activities may be required during installation of SVE systems, and the excavation and disposal of soil may cause runoff regulated by these permit conditions.

Table 2-17
Applicable or Relevant and Appropriate Requirements

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District				
Local Rule 2201, Section 4.1	New and Modified Stationary Sources; Best Available Control Technology	Applicable for operation of an SVE system.	Requires nitrogen oxide and VOC controls on new sources using best available control technology (BACT). There are BACT performance standards for carbon adsorption .	Applies to all new stationary sources. Should emissions of VOCs or nitrogen oxide exceed 2 pounds per day, the emissions unit must apply BACT to ensure greater than 95% removal of the offending analyte(s). For explicit BACT requirements under this rule, refer to San Joaquin Valley Unified Air Pollution Control District BACT Clearinghouse. BACT for Carbon Adsorption is found under Remediation and Waste and Disposal.
Local Rule 4102	Nuisance Rule	Applicable for any source operation that emits or may emit air contaminants	Limits emissions of odors and other nuisance material to the air that may cause or have a natural tendency to cause injury or damage to business or property. The emissions from the SVE system will be managed to meet odor and other nuisance material limits.	The purpose of this rule is to protect the health and safety of the public.
Local Rule 4651	Requirements for the control of Volatile Organic Compound Emissions from Decontamination of Soil	Applicable for VOC emissions from the soil stockpiles.	VOC-contaminated soil must be monitored during excavation. If VOCs are detected, the stockpile must be covered with a layer of uncontaminated soil no less than 6 inches deep or covered with tarp.	

Table 2-17
Applicable or Relevant and Appropriate Requirements

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District				
Local Rule 8020	Requirements for Control of Fine Particulate Matter (PM10) from Construction, Demolition, Excavation, and Extraction	Relevant and appropriate to any on-site excavation or temporary storage of hazardous soils and remediation wastes prior to off-site transport and treatment or disposal.	Limits fugitive particulate emissions. Requires appropriate dust control measures during excavation, soil stabilization methods for storage piles of dirt, and limits visible dust emissions from on-site unpaved roads.	Rule 8010 exempts remedial actions from these and all fugitive particulate prohibitions because they are "actions required to protect the environment by federal or state law or regulation." Therefore, fugitive particulate emissions prohibitions are not applicable, but are relevant and appropriate. Visible dust emissions comprise visible dust of such opacity as to obscure an observer's view to a degree equal to or greater than an opacity of 40% for a period or periods aggregated more than 3 minutes in any 1 hour.

Regulation	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Location Specific ARARs				
Federal Endangered Species Act and California Fish and Game Code				
Federal Endangered Species Act of 1973	Limits use of designated critical habitat upon which endangered or threatened species depend	Applicable to Buildings 1762 and 1709 sites.	Requires action to avoid jeopardizing the continued existence of listed endangered or threatened species or modification of their habitat.	Applicable to the vernal pool fairy shrimp observed at the airport and listed as threatened by the U.S. Fish and Wildlife Service.
California 14 CCR 2050	Taking, Importation or Sale of State Endangered Species or a Threatened Species	Potentially applicable to sites located in relatively undisturbed areas of the airport. Final determination of site applicability to be made in CB ROD Part 2.	Action must be taken to conserve endangered species; there can be no releases and/or actions that would have a deleterious effect on species or habitat.	Applicable to the Colusa grass (*neostapfia colusana*) observed at the airport in May 1993, and listed as endangered by the State of California
California 14 CCR 1900	Native Plant Protection	Potentially applicable to sites located in relatively undisturbed areas of the airport. Final determination of site applicability to be made in CB ROD Part 2.	Actions must be taken to conserve native plants; there can be no releases and/or actions that would have a deleterious effect on species or habitat.	Applicable to those sites located in wetland or upland habitats.
California 14 CCR 3005	Birds and mammal protection	Potentially applicable to sites located in relatively undisturbed areas of the airport. Final determination of applicability to be made in CB ROD Part 2.	Actions must be taken to prohibit the taking of birds and mammals, including taking by poison.	Applicable to those sites located in wetland or upland habitats.

Table 2-17
Applicable or Relevant and Appropriate Requirements
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Legend:

AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
BACT	best available control technology
BAT	best available technology
BCT	best conventional pollutant control technology
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene, xylenes
CB	Comprehensive Basewide
CCR	California Code of Regulation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
CVR	Central Valley Region
DTSC	Department of Toxic Substances Control
DWQ	Department of Water Quality
EPA	Environmental Protection Agency
FR	Federal Register
LDR	land disposal restrictions
MTR	minimum technological requirements
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
PM10	particulate matter less than 10 microns in diameter
PRAO	preliminary remedial action objective
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
RWQCB	Regional Water Quality Control Board
SCOU	Source Control Operable Unit
SVE	soil vapor extraction
SWRCB	State Water Resource Control Board
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
UTS	universal treatment standard
VOC	volatile organic compound
WET	California waste extraction test

Federal and California Waste ARARs

The U.S. EPA and California hazardous and nonhazardous solid waste regulations presented below and in Table 2-17 are applicable or relevant and appropriate requirements to:

- Sites with residual contamination that threatens water quality regardless of remedial technology
- On-site remediation wastes generated during drilling or excavation/off-site disposal activities.

Under California regulations Titles 23 (Division 3, Chapter 15) and 27 of the CCR, sites that undergo cleanup by public agencies are exempt from most of the waste management regulations in these titles (except for the waste classification and disposal requirements). Soils that are excavated and contained or staged temporarily at the site must comply with relevant waste management requirements to the extent feasible. In addition, water quality monitoring requirements in these two titles may be relevant and appropriate to remediation sites that continue to threaten water quality. In the case of federal regulations, contaminated soils remaining in the ground at the site are not considered to be wastes until they are excavated or removed from the ground. Therefore, contaminants left in the ground at sites are not regulated as wastes under federal regulations. These federal and state regulations are summarized below.

Waste Classification ARARs

Excavated soil and SVE drilling wastes will be classified and managed in accordance with federal and California solid and hazardous waste management regulations cited in Table 2-17.

California waste classification regulations are considered to be more stringent than the U.S. EPA. California regulation includes both RCRA (i.e., federal) and non-RCRA (i.e., California) hazardous wastes, as well as designated and inert nonhazardous solid waste. California hazardous waste regulations require additional toxicity testing for wastes that may be characteristically hazardous. Hazardous waste classification requirements contained in 22 CCR Section 66261 applies to the characterization of excavated contaminated soil, debris, and other associated remediation wastes (e.g., spent carbon, decontamination liquids, and disposable equipment) as hazardous wastes.

In addition, the U.S. EPA hazardous waste identification regulations and associated "contained-in" policy also applies to the classification of remediation wastes as hazardous. The U.S. EPA "contained-in" policy states that contaminated soil and other associated remediation wastes are hazardous wastes ("contained-in") if they are:

- Characteristically hazardous; or
- Contaminated with a listed hazardous waste with contaminant levels above site-specific health-based criteria.

These soils and associated wastes must be managed as hazardous wastes until they no longer contain hazardous wastes or are "contained-out" (i.e., the soil has been treated so that it no longer contains listed hazardous waste and does not exhibit any hazardous waste characteristic). Only the "contained-in" hazardous soils are subject to hazardous waste management requirements listed in Table 2-17 while temporarily stored on-site and land disposal restrictions (LDRs) once they are transported off-site.

In accordance with these federal and California hazardous waste classification ARARs, the excavated soil must be classified using either of the following:

- Generator knowledge of whether or not the soil was contaminated with a listed RCRA or non-RCRA hazardous waste (as defined in 22 CCR 66261.30, 66261.100, and 66261.101, Appendix X and Appendix XII) or used oil containing more than 1,000 mg/kg total organic halogens or 5 mg/kg PCBs (22 CCR 66279 and 23 CCR 25250); or
- Waste analysis (toxicity characteristic testing according to 22 CCR 66261.24).

Excavated contaminated soil must be classified using generator knowledge or waste analysis. If, based on generator knowledge, the soil contains a listed hazardous waste, then the soil is considered hazardous based on U.S. EPA's "contained-in policy." If, based on waste analysis, the soil fails the RCRA characteristic test, the soil is considered hazardous. In both instances, the hazardous soil must be managed as hazardous waste and the soil must be treated, stored, and disposed of in accordance with RCRA regulations listed in Table 2-17. In this site, the Air Force has no definitive knowledge that the soil contains a listed hazardous waste. Nevertheless, in certain circumstances, such as when the COC or detected concentration in the soil is similar to a listed hazardous waste, the Air Force may consider the U.S. EPA contained-in policy relevant and appropriate. In these discretionary circumstances, the Air Force will comply with the relevant and appropriate RCRA treatment and storage requirements. Although not technically an ARAR because it applies to an activity offsite, the Air Force will comply with the offsite rule in disposing of the soil offsite.

Wastes that are determined to be nonhazardous may be disposed of in any classified landfill (i.e., Class I, II, or III) that is authorized to accept such waste as specified by 27 CCR 20200. Special requirements and restrictions apply to the disposal of liquid wastes and wastes containing free liquids. Nonhazardous solid wastes may also be classified as inert wastes if they do not contain hazardous wastes or soluble pollutants at concentrations in excess of applicable water quality objectives and do not contain significant quantities of decomposable wastes. Inert wastes do not have to be disposed of at classified landfills.

Designated wastes are either exempted hazardous wastes or nonhazardous wastes that contain pollutants at levels that threaten water quality (23 CCR 13173). Designated wastes must be disposed of at a Class I or II landfill.

Waste Management ARARs

State ARARs Regarding Cleanups and On-site Temporary Waste Management Units

The remediation wastes generated during drilling or excavation must be classified and properly disposed of offsite in accordance with California waste regulations. In addition, remediation sites and the temporary on-site storage units for remediation wastes that threaten water quality must comply with applicable Title 27 or Title 23 requirements to the extent feasible. These requirements include:

- Water quality monitoring (27 CCR 20080(g) and 20380 for nonhazardous managements waste units and 23 CCR 2510(g) and 2550 for hazardous waste management units) that involves detection, evaluation and corrective action monitoring as needed to address releases that potentially threaten water quality;
- Closure requirements (27 CCR 20950, 22207(a), 22212(a), and 22222; and 23 CCR 2550.0(g), 2580, 2580(f)) which are applicable to sites that continued to receive waste discharges after November 27, 1984 and are relevant and appropriate to remediated sites where residual contamination threaten water quality. Landfill cover requirements (27 CCR 21090 or alternative engineered systems with equivalent performance) may also be relevant and appropriate to sites with residual contamination that threatens water quality. Surface impoundment closure regulations may also be relevant and appropriate to retention ponds created during remediation for staging decontamination wash waters or storm water management that has contacted contaminated soils and threatens water quality.

Hazardous Waste Land Disposal Restrictions

The U.S. EPA promulgated a Final Rule for LDRs Phase IV (63 FR 28555-28604, May 26, 1998) in 40 Code of Federal Regulation (CFR) Part 268 that establishes treatment standards for RCRA hazardous soils and debris. California has adopted these federal treatment standards in 22 CCR 66268. California has not promulgated treatment standards for non-RCRA hazardous wastes that are likely to be generated at the sites, except for metal-containing, aqueous, non-RCRA hazardous wastes (22 CCR 66268.107). These federal and California LDR treatment standards apply to any excavated RCRA hazardous soils or debris, or non-RCRA metal-containing, aqueous wastes (e.g., decontamination liquid wastes) once they are transported off-site. They also apply to off-site management of any nonhazardous remediation wastes that have contaminant levels above the LDR treatment standards.

The Final LDR Phase IV Rule requires that excavated soils be treated to ten times the Universal Treatment Standards (UTS). Hazardous debris treatment standards are based on decontamination technologies listed in 40 CFR Part 268.40-268.49. Other remediation wastes (i.e., decontamination wastewater and disposable equipment solid wastes) generated during excavation or well installation must be tested for waste classification and the contaminant levels compared to the individual hazardous constituent UTS for wastewater and non-wastewater. Decontamination water suspected to have metal contamination must also be toxicity tested using the California WET and compared to the numerical treatment standards contained in 22 CCR 66268.107, Table II. If the contaminant levels exceed their respective RCRA or non-RCRA LDR treatment standards, then they must be manifested, transported, and disposed of as hazardous wastes.

Hazardous Waste Generator Requirements

Since California regulates both RCRA and non-RCRA hazardous wastes, the substantive generator manifesting, record keeping, and labeling and placarding requirements contained in 22 CFR 66262 are applicable to any hazardous remediation wastes that are to be transported offsite for treatment and disposal. Generators must (1) determine whether the wastes are RCRA or non-RCRA hazardous (22 CCR 66262.11); (2) complete manifest forms (22 CCR 66262.20-66262.23, including submission of the forms within 30 days to the DTSC); (3) packaging, labeling, marking, and placarding the wastes (22 CCR 66262.30-66262.33); (4) maintain records; and (5) submit biannual reports. The accumulation time requirements in 22 CCR 66262.34 and 66262.34 are not ARARs for CERCLA AOCs. Hazardous waste generator regulations are cited as ARARs for the remedial activities at the SCOU ROD Part 2 sites.

Storm Water Discharge Requirements

The California State Water Resources Control Board (SWRCB), has elected to adopt NPDES general permit No. CAS000002 for storm water discharges. This general permit is applicable for construction activity that results in soil disturbances of more than five acres. It also applies to smaller sites that are part of a larger common plan. The excavation, grubbing, clearing, and other activities required during the installation of the SVE systems, and the excavation and disposal of soil, may cause runoff regulated by this permit.

The SWRCB has not established numeric effluent limits for pollutants in storm water. However, the narrative for the effluent standards includes the requirement to implement best available technology (BAT) economically achievable and best conventional pollutant control technology (BCPCT) to reduce or eliminate storm water pollution. Inspection of the construction site prior to and during storm events is also required to determine effectiveness of BAT and BCPCT. SWRCB Order 97-03-DWQ regulates pollutants in stormwater discharge from hazardous waste treatment, storage and disposal facilities, wastewater treatment plants, landfills, land application sites, and open dumps. These state orders would apply or be relevant and appropriate to large-scale excavation work areas and long-term on-site remediation waste storage units if they threaten surface water quality.

Clean Air Requirements

The SVE and excavation activities are subject to clean air requirements, including the rules and regulations of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). The SCOU ROD Part 2 SVE sites will implement carbon adsorption for vapor treatment. The following requirements are ARARs for the SVE and excavation alternatives:

- SJVUAPCD Rule 2201 - New Source Review: Requires that any new source meet emission limitations for criteria air pollutants, including use of best available control technology (BACT) for soil remediation.
- SJVUAPCD Rule 4102 - Nuisance Standard: Limits emissions of odors and other nuisance material to the air.

- SJVUAPCD Rule 4651- VOC Emissions from Decontamination of Soil: Requires VOC contaminated soils to be covered.
- SJVUAPCD Rule 8020 - Fugitive Dust: Limits visible particulate emissions at the property line.

New Source Review (Rule 2201)

Rule 2201 requires SVE systems be equipped with BACT if the off gases result in an increase greater than two pounds per day of VOCs. The SJVUAPCD BACT Guidelines require the following cleanup standards for soil SVE operations:

- Carbon adsorption BACT must ensure greater than ninety-five percent removal of VOCs in excess of two pounds per day (BACT Guideline 2.1.3).

Rule 2201 requires emissions reductions from existing sources to offset increases of emissions in new sources to achieve air quality; however, offsets are not required for remediation systems provided that total cumulative emissions from the remediation systems do not exceed two tons per year of nitrogen oxides or VOCs.

Nuisance Standard (Rule 4102)

Rule 4102 limits off-gassing of odors and other nuisance material to the air that may cause or have a natural tendency to cause injury or damage to business or property. The SVE system off-gases will be managed to meet these limits.

VOC Emissions from Soil (Rule 4651)

Rule 4651 applies to the VOC emissions from soil stockpiles. Soil that registers fifty parts per million or greater of VOCs when measured as hexane at a distance of three inches above the surface with an organic vapor analyzer must be covered with a layer of uncontaminated soil no less than 6 inches deep, or covered with a tarp.

Fugitive Dust (Rule 8020)

Rule 8020 limits fugitive particulate emissions. However, Rule 8010 exempts "actions required to protect the environment by Federal or State law or regulation." Therefore, fugitive particulate emissions prohibitions are not applicable, but are relevant and appropriate. Control of visible dust is relevant and appropriate during all construction activities including:

- Grubbing, scraping, trenching, and leveling
- Storage and transportation of soil
- Use of unpaved roads, parking and storage areas, and
- Track-out onto paved roads.

Application of water, dust palliatives, vegetative cover, use of wind fences, tarps, or three-sided enclosures to control dust is required for disturbed areas. Application of water, speed limits, and restricted traffic is required on unpaved roads. Track-out onto paved roads must be prevented. Trench areas must be presoaked before excavating. Spillage onto public roads must be prevented or cleaned daily.

2.13.2 Five-Year Review

In compliance with CERCLA requirements, a five-year review process has been developed to assess the effectiveness of remedial actions undertaken at Castle Airport. Five-year reviews are comprehensive, basewide, statutory reviews of all remedial decisions at Castle Airport. The goal of the reviews is to confirm that the selected remedial actions comply with performance standards established in the Castle RODs, cleanup goals are being achieved in accordance with the selected remedy, and that the selected remedial actions continue to be protective of human health and the environment. Representatives from the DTSC, the RWQCB, the U.S. EPA, and the Air Force participate in this review process.

A review will be conducted every five years until contaminant concentrations are reduced to levels that no longer pose an adverse risk to public health and groundwater. The initial review for Castle Airport was conducted in 1998 and focused primarily on groundwater remediation at OU-1 and OU-2. The next review is scheduled for 2003 and will include an evaluation of all selected remedies included in RODs for Castle Airport, including an evaluation of ARARs.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

The *SCOU Revised Proposed Plan* for 50 SCOU ROD Part 2 sites was submitted to the RAB and the public for review on February 12, 2001, and a public hearing was held at the Atwater City Council Chambers on February 21, 2001. Public comments were received and are provided in the Responsiveness Summary in Section 3. The selected remedies for the VOC sites and waste oil tank and OWS sites are consistent with the preferred remedial alternatives designated in the *SCOU Revised Proposed Plan* with the exceptions described below. Sites PCB-4, PCB-5, and PCB-6 were addressed in the SCOU *Proposed Plan* issued in 1997, and changes to the preferred alternatives are described below.

Building 54 Group

The FS evaluated remedial alternatives for addressing TCE in soil gas and TVPH in soil exceeding the WQSA thresholds. The selected remedial alternative for the Building 54 Group is SVE and bioventing as specified in the February 2001 *Revised Proposed Plan.* However, the inclusion of bioventing as a component of the selected alternative was based upon a TEPH concentration (920 mg/kg) in exceedence of the preliminary RAO for TEPH (100 mg/kg) used in the SCOU FS. The subsequent revision of the TEPH RAO to 1,500 mg/kg resulted in the elimination of TEPH as a COC. Thus, the selected remedy for the Building 54 Group is SVE as discussed in Section 2.12 of this ROD.

Building 1350

The FS evaluated remedial alternatives to address TCE and PCE in soil gas and TEPH in soil exceeding WQSA thresholds. The preferred remedial alternative for Building 1350 published in the February 2001 *Revised Proposed Plan* was SVE with supplemental intrinsic remediation and bioventing. However, the inclusion of intrinsic remediation and bioventing as a component of the preferred alternative was based upon the detection of TEPH in excess of the RAO during the SCOU RI. However, the TEPH was removed during UST excavation and removal in 1996. Thus, the selected remedy for B1350 is SVE as discussed in Section 2.12 of this ROD.

Discharge Area 4

The FS evaluated remedial alternatives addressing TCE and cis-1,2-DCE in soil and soil gas exceeding WQSA thresholds. The preferred remedial alternative is SVE as specified in the February 2001 *Revised*

Proposed Plan. SVE was performed as a removal action from August 1996 to January 1997 (JEG, 1998). SVE was restarted in November 2001 as a component of the SVE Decision Study in order to address low level TCE contamination in soil gas. Preliminary results of the SVE Decision Study at DA-4 indicate that the French drain impedes subsurface vapor flow, and excavation will be required to remove residual VOCs near the French drain upon completion of SVE. Thus, excavation has been added as a component of the selected remedy for DA-4 as discussed in Section 2.12 of this ROD.

Building 1532

The preferred remedial alternative for Building 1532 in the SCOU *Revised Proposed Plan* was SVE. The performance of the SVE decision study, and the results of confirmation sampling, indicate that RAOs at Building 1532 are not exceeded, and that NFA is required to protect human health and groundwater quality. Details regarding the decision study and site closure activities for Building 1532 are provided in Section 2.8.3.1.

SWMUs 4.3 and 4.21

The selected remedial alternative for SWMU 4.3 and 4.21 is excavation and off-site disposal as specified in the February 2001 *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. In addition, bioventing has been added to the remedy to address site contamination that will remain under concrete-encased utility lines within the site that cannot be cost-effectively removed by excavation or re-routing of the utility lines. The CERCLA basis for adding bioventing to the selected remedy is that bioventing had been identified in the SCOU FS and the SCOU *Revised Proposed Plan* as a component of the preferred alternative at DA-5, expressly to address residual hydrocarbon contamination at SWMUs 4.3 and 4.21 within the DA-5 site.

Building 1541, SWMUs 4.5, 4.7, 4.8, 4.14, 4.15, 4.17, 4.18, 4.23, 4.29

The preferred alternative for SCOU sites Building 1541, SWMUs 4.5, 4.7, 4.8, 4.14, 4.15, 4.17, 4.18, 4.23, and 4.29 in the SCOU *Revised Proposed Plan* was excavation and off-site disposal. Based upon the results of confirmation sampling performed upon completion of site cleanups or during supplemental site investigations, the sites have been determined to require NFA to protect human health and groundwater quality. Details regarding investigation and/or cleanup activities for each site are provided in Section 2.8.3, No Further Action Sites.

PCB-4, 5, 6

The preferred alternative for PCB-4, PCB-5, and PCB-6 in the *SCOU Proposed Plan* was ICs. Based upon the results of characterization sampling and post-excavation confirmation sampling, the sites have been determined to require NFA to protect human health and groundwater quality. Details regarding investigation and/or cleanup activities for PCB-4, PCB-5, and PCB-6 are provided in Section 2.8.3, No Further Action Sites.

Stains 33 through 44

The preferred alternative for Stains 33 through 44 was designated as ICs in the *SCOU Revised Proposed Plan*. However, the stains are the result of aircraft emissions and therefore, are not subject to the provisions promulgated by CERCLA. Definition 22, from Section 9601 of CERCLA, reads as follows:

The term 'release' means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes (A) any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons, (B) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine, (C) release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.), if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under Section 170 of such Act (42 U.S.C. 2210), or, for the purposes of Section 9604 of this title or any other response action, any release of source byproduct, or special nuclear material from any processing site designated under Section 7912(a)(1) or 7942(a) of this title, and (D) the normal application of fertilizer.

Although exempt from CERCLA, the stains are subject to applicable RCRA and State of California laws and regulations, including those for protection of groundwater quality.

3.0 RESPONSIVENESS SUMMARY

3.1 PUBLIC COMMENTS ON THE REVISED PROPOSED PLAN

The *SCOU Revised Proposed Plan* was submitted for a 30-day public review period from February 12, 2001, through March 13, 2001. The *SCOU Revised Proposed Plan* was available at the Merced County Library and the Information Repository located at Castle Airport. In addition, a public hearing to discuss the *SCOU Revised Proposed Plan* was held on February 21, 2001 at the Atwater City Council Chambers. The public was invited to review and comment, either orally or in writing, on the remedial alternatives presented in the *SCOU Revised Proposed Plan.*

Comments were submitted at the public hearing by Mr. Ron Gardner, manager of the Castle Air Museum RV Park. Mr. Gardner presented his comments both verbally and in writing. Mr. Gardner's comments and the Air Force's responses are provided below. A copy of the reporter's transcript of the public hearing is included in Appendix F. None of the public comments resulted in modification of the preferred remedies presented in the *SCOU Revised Proposed Plan.*

Public Comments on the *SCOU Revised Proposed Plan*
Public Hearing, February 21, 2001
Atwater City Council Chambers

Dear Sirs,

My name is Ron Gardner. My wife and I manage the Castle Air Museum RV Park. As full time Base residents we are concerned with long term exposure limits to contaminants. I'm also a foreman for Granite Const. Co. and have been directly involved in Base clean up for the past 2 ½ years, prompting concern for my crew and my own short term exposure.

The Feb. 2001 ENVIRO Fact Sheet states, "The Air Force has conducted the Remedial Investigation and Feasibility Study (RI/FS), under the Comprehensive Environmental Response, Compensation and Liability Act of 1980" or CERCLA commonly known as the Superfund Law. The CERCLA Act set up a program in the EPA to:

1. Identify abandoned toxic waste sites.

2. Ensure clean up by responsible parties or the government.

3. Evaluate damage to natural resources.

4. Allows EPA to set a National Priorities List.

In 1986 the Congress passed the Superfund Amendments and Reauthorization Act. Sara changed the Superfund by among other things:

1. Adding the availability of third party lawsuits.

2. Greater citizen input.

3. Increased civil and criminal penalties.

4. Discourages land disposal.

5. Stringent clean up standards with preference for permanent solutions.

While the ENVIRO Fact Sheet didn't mention SARA, I can only believe they are involved due to "Preferred Cleanup Methods", and citizen input, as Title III of SARA is entitled, "Community Right To Know and Emergency Act".

In light of CERCLA and/or SARA involvement I have the following questions addressed to Air Force Base Conversion Agency, US EPA, Department of Toxic Substances Control, and California Regional Water Quality Control Board:

I thank you for your time and efforts in this matter.

Ron Gardner
P.O. Box 1011
Atwater, CA 95301

SPECIFIC COMMENTS

Item	Comment
1	Comment: Do the 50 sites listed consist of all known contaminated sites? Response: A total of 233 sites were evaluated during the *Remedial Investigation and Feasibility Study* (RI/FS). The *Revised Proposed Plan* includes only the 50 sites to be addressed by SCOU Record of Decision (ROD) Part 2. *SCOU ROD Part 1* addressed 182 sites. The final SCOU site will be included in the Comprehensive Basewide ROD.
2	Comment: Might more sites arise in the future requiring cleanup? Response: The RI identified potential contaminated sites based upon historical operations at the base. The potential sites were then sampled to indicate the presence of contaminants. Sites with contamination present at concentrations exceeding regulated levels were then evaluated for remedial action in the FS. Although it is possible that additional sites may be discovered, it is considered unlikely since the RI was a comprehensive and thorough effort.
3	Comment: Is cleanup criteria based on safe exposure limits to contamination set by the EPA, EPA Office of Solid Waste, OSHA, CALOSHA, or the National Institute of Occupational Health and Safety (NIOSH)? Response: Cleanup levels for some of the sites are based upon U.S. EPA criteria for adverse human health risk. However, most of the sites described in the *Revised Proposed Plan* do not contain contamination that directly serves as an adverse human health risk. The sites do pose a threat to groundwater quality, and cleanup levels are based upon California Regional Water Quality Control Board criteria established to protect groundwater quality.
5	Comment: Is the Permissible Exposure Limit (PEL) for cleanup criteria based on Immediately Dangerous to Life or Health (IDLH), Short Term Exposure Limits (STEL), or Time Weighted Average (TWA)? Response: Cleanup criteria are based upon potential risk to human health and groundwater (see response to comment # 3). Calculations of human health risk are based upon long-term exposure (30 years) applicable to residential reuse of the base. The PEL, IDLH, STEL, and TWA are short-term exposure limits applicable to site workers during investigation and cleanup, and are not used to establish cleanup levels.

Item	Comment
6	Comment: Of the 50 sites listed, the preferred cleanup method for 21 sites is Soil Vapor Extraction, or in combination with bioventing. Using these methods, how many years must extraction and monitoring take place to complete? Response: It is estimated that SVE activities will require approximately two and a half years, including six months to install the systems, and one to two years of operation, rebound evaluation, and completion of a closure report for each site.
7	Comment: There are 3 sites listed with metals and lead which will be cleaned up by SVE. How long does it take metal and lead to decompose completely into vapors that can be extracted? Response: Metals are nonvolatile and do not vaporize. The contaminants listed in the Fact Sheet apply generally to the type of site category. Although they are listed as a type of contaminant in the Fact Sheet, metals are not a concern at Building 1266, Sanitary Sewer 2, and Storage Area B3. SVE and bioventing is proposed for the 3 sites in order to remove volatile and semi-volatile organic compounds present in the soil at depths up to 55 feet, too deep for excavation.
8	Comment: Sites 32 & 33 list contamination being metals and PAH's from utility pipes and storm drains, with cleanup by SVE. If these pipes and drains are still intact or partially intact, wouldn't removal and disposal be the preferred method? Response: Site 32 is Building 1266 and Site 33 is Sanitary Sewer 2. SVE and bioventing is proposed for both sites in order to remove volatile and semivolatile organic compounds present in the soil at depths up to 55 feet, too deep for excavation.
10	Comment: Doesn't Excavation with Offsite Disposal or Zoned Capping with Institutional Control provide quick, complete, and permanent cleanup for most sites? Response: Excavation and disposal does provide quick, complete, and permanent cleanup for shallow soil sites, and is the preferred remedy for 16 of the 50 sites. However, zoned capping with institutional controls is not appropriate for any of the remaining 50 sites and therefore, is not a preferred remedy.
11	Comment: Can any or all of Base property be deeded to Merced County prior to final cleanup? Response: The property can be deeded upon concurrence with regulatory agencies after it has been established that the remedial systems are successfully cleaning the sites as designed. However, remedial systems will be operated as long as required in order to achieve cleanup goals. The Air Force remains responsible for cleanup after transfer of any contaminated property.

Item	Comment
12	Comment: Since JPA no longer exists, will the city of Atwater have any control in the cleanup process? Response: The City of Atwater will not have direct control in the cleanup; however, a city councilman is a current member of the Restoration Advisory Board (RAB), a forum for community input regarding cleanup at Castle. The RAB meets quarterly and members of the community are invited to attend and participate.
13	Comment: On the 50 known sites, what is the estimated time frame to start and complete cleanup? Response: The SVE sites will require the longest amount of time to complete, estimated at approximately two and a half years. The current schedule indicates that installation of the SVE systems will be complete by the end of 2002. Therefore, cleanup of the SVE sites is expected to be completed by 2005 or 2006.

3.2 REGULATORY AGENCY COMMENTS ON THE FINAL SCOU ROD PART 2

The Final SCOU ROD Part 2 was submitted to the U.S. EPA, DTSC, and RWQCB for review and comment. The comments and Air Force responses are provided below.

RESPONSE TO REVIEW COMMENTS GIVEN BY U.S. EPA

Document: **Castle Airport Source Control Operable Unit, Record of Decision, Part 2, Final, February 2003.**

Responses prepared by: **Earth Tech, Inc.**
100 West Broadway, Suite 240
Long Beach, CA 90802

General Comments

Item	Page	Section	Comment
1			**Comment:** The ROD needs to be clear in the Declaration that most of the 41 CERCLA sites in this ROD have been remediated under the CERCLA removal process after the finalization of the proposed plans. This ROD documents that the remedies implemented during the removal actions are consistent the remedies selected in the Proposed Plans. EPA suggests that adding a table similar to Table 2-10 but also includes the selected remedies for all 41 CERCLA sites in the Declaration under Description of Selected Remedies. The table should provide the following information: site name, selected remedy in the proposed plan, removal action (if any), final remedy in the ROD, and remedial status (whether RAOs have been achieved or remedy is in on-going during removal actions). **Response:** A table has been added to the Declaration under Description of Selected Remedies and includes the following information: site name, preferred alternative in the proposed plan, removal action (if any), selected remedy, and remedial status.

Item	Page	Section	Comment
2			**Comment:** The ROD has to distinguish between those sites where cleanup has already taken place (either SVE completed or excavation and off-site disposal done) and those where the remedy still has to be implemented or is in the process of implementing. For those sites where cleanup is done, the ROD should discuss what was done, what ARARs were applied and complied with during and at completion of the removal action; for those sites where the remedy is still being implemented or will be implemented, the ROD should discuss what ARARs will apply (either applicable or relevant and appropriate). **Response:** The ROD categorizes sites into 4 groups: 21 VOC sites, 6 shallow soil sites, 14 NFA sites, and 12 CERCLA-exempt sites (See response to Specific Comment 1 for revisions to these classifications). The selected remedies are clearly specified as SVE for the VOC sites, excavation and offsite disposal for the shallow soil sites. Sites where the cleanup has been completed, either by SVE or excavation, have been assigned a selected remedy of NFA. No remedy is presented for the CERCLA-exempt sites, as they are included only for tracking purposes. Per comment #1, a table has been added to the Declaration which summarizes the remedy and status of each CERCLA site. ARARs and RAOs for the SCOU ROD Part 2 sites that require remedial action are described in detail in Sections 2.13.1 and 2.7, respectively, including comprehensive tabulations of ARARs, and human health and groundwater protective RAOs and thresholds. Additionally, for all sites requiring remedial action (whether ongoing or in the future) with the exception of SWMUs 4.6 and 4.22, COCs triggering the remedial action are clearly specified in each site summary. For the 14 NFA sites in included in Section 2.8.4, the BCT-approved Closure Report is referenced as documentation of the completed cleanup. In following the approach used for SCOU ROD Part 1, ARARs are not provided for sites with a selected remedy of No Further Action.
3			**Comment:** The Record of Decision (ROD) should be subjected to a thorough technical edit so that minor inconsistencies or errors can be corrected. Because the ROD represents a legally enforceable documentation of the remedial action plan, errors that would not necessarily require revision in other types of documents, such as a remedial investigation report, are not appropriate here. For example, chemical names and acronyms should be used consistently throughout the ROD in text and tables (e.g., FC113 versus Freon 113). **Response:** The ROD has been subjected to a thorough technical edit as requested.

Item	Page	Section	Comment
4			**Comment:** The ROD uses languages for the six shallow soil sites as if the remedies for these sites would be carried out in the future while the fact is most of the cleanups had already been completed. Please clarify the remedial status of the six shallow sites in Selected Remedy Section for each site as well as in the suggested table in the Declaration. **Response:** Site summaries of the shallow soil sites provide descriptions of excavations conducted during removal of OWSs or ASTs under the CAFB tank and OWS program. However, sampling results indicate that contaminants are still present at levels requiring remediation at SWMUs 4.3, 4.4, 4.16, and 4.21, even after tank/OWS removal. The COCs are clearly listed for each site. However, although no COCs are known to be present at SWMUs 4.6 and 4.22, confirmation of cleanup has not been documented. Thus, cleanup has not been completed at any of the 6 shallow soil sites. The ROD correctly specifies the remedial status of each shallow soil site, including that remedial action is forthcoming at SWMUs 4.3, 4.4, 4.16, and 4.21, and confirmation sampling is required at SWMUs 4.6 and 4.22. Additionally, the remedial status of the six shallow soil sites has been included in the table added to the Declaration per comment #1.
5			**Comment:** The Site Characterization sections for the six shallow soil sites do not have the sampling data summaries as do the VOC or no further action sites. Also, the 14 No Further Action sites do not have a section on the final selected remedy. Please add the data summaries and the missing sections. **Response:** The Site Characterization sections for all but SWMU 4.3 include the sampling summaries as provided for the VOC and NFA sites. To be consistent with the other sites, the sampling summary specific to SWMU 4.3 will be included in the Site Characterization section for SWMU 4.3. The same subsections as used for the active remediation sites, including the "Selected Remedy" section, will be used for each NFA site.

Item	Page	Section	Comment
6			**Comment:** The tables in the site summaries show the results obtained during the Source Control Operable Unit Remedial Investigation/Feasibility Study (SCOU RI/FS) and any subsequent investigations as separate events. In some instances the basis for the selected remedy is based on data collected subsequent to the RI. The information presented in the tables in these sections should be revised such that all of the data upon which the selected remedy is based is presented in a seamless manner. In addition, because the Water Quality Site Assessment (WQSA) Remedial Action Objectives (RAOs) are specific to various depth intervals instances where the maximum reported detection of each analyte is noted should also include the depth at which the reported detections were observed, as this information is needed to confirm whether specific WQSA criteria were exceeded **Response:** The post-RI investigations are presented separately since the rationale for the sampling and analysis was based upon the results of the RI. The Data Gap Investigation and SVE Decision Study represented important sampling events, which included significant BCT interaction and approval. Presentation of the separate investigations provides a chronologic history of site characterization. The data sets from the various investigations are not contemporaneous, and in some cases, post-RI sampling focused specifically on quantification of known COCs. Presentation of the results of separate events independently allows for a clearer understanding of the basis for remedy selection. The data is organized and comprehensive, and no changes to the presentation have been made. Since the WQSA thresholds are depth-specific, the maximum concentrations may not exceed the thresholds if detected in shallow soils and lesser concentrations, if they are detected in deeper soils, may exceed the thresholds. Exceedences of WQSA thresholds are appropriately included in the "Environmental Assessment" and "Site COCs and RAOs" sections for each site. These sections specify the concentration of each COC and the applicable WQSA depth range that was exceeded. In order to assist the reader in determining the depth at which the maximum values were detected, the maximum results table will include a column for the depth at which the maximum was detected.

Item	Page	Section	Comment
7			**Comment:** For sites contaminated with petroleum hydrocarbons, the text in each case typically notes that "since TVPH and TEPH represent groups of compounds, the data are not suitable for risk quantification" and that specific total petroleum hydrocarbon (TPH) constituents, if identified, were evaluated in the human health risk assessment (HHRA). It appears that this phrase is simply used as boilerplate language without regard to the specific data that has, in fact, been collected. In may cases, the associated tables show that specific TPH constituents have been either at least analyzed for, and in some cases were detected. In each specific case, the text should contain specific information regarding whether analyses were performed that identified specific TPH constituents for evaluation in the risk assessment, and if so, which constituents were identified, and whether detected constituents were evaluated in the human health risk assessment. For example, the text for DA-5 should clearly note that no specific TPH constituents were identified, while the text for site SWMU 4.16 should state that benzene, ethylbenzene, naphthalene, toluene, trimethylbenzene, and xylenes (all TPH constituents) were detected in soil and soil gas. **Response:** TPH constituents that were identified during the site investigations are included in the table of maximum detections provided for each site. In accordance with the approach specified in Section 2.6.1, all of these detected constituents were evaluated in the BHHRA. The text referenced by the comment is first brought out in Section 2.6.1.1 and then repeated in the site summaries for sites where TPH was an issue. As an alternative to the revision suggested by the comment, the Air Force would prefer to delete the "boilerplate" statement included in the site-specific summaries. Given the summary presentation of maximum detections for all COPCs, it is probably unnecessary to call out specific TPH constituents at each site. Please note that specific TPH constituents were identified at DA-5 (see table of maximum detections) and were included in the BHHRA.

Item	Page	Section	Comment
8			**Comment:** The site figures presented in Appendix E appear to have been assembled from various sources, and reflect the different uses for which they were prepared. The figure numbers do not reflect any particular order, and in several instances there are duplicate figure numbers. Please revise the figures to use a consistent format and sequential numbering. **Response:** Site figures were gathered from various documents produced by several Air Force contractors. The figures are presented according to the order of presentation of the sites in the site summaries. The figures are provided because they include the substantive requirements for the purposes of the ROD. To address the comment, the existing figures will remain the same but will be clearly numbered Figure E-1 through E-x for the purposes of the SCOU ROD Part 2. The site text will refer to all applicable figures for the site.

Item	Page	Section	Comment
Specific Comments			
1	Page 1-3	Top Paragraph	**Comment:** To be consistent with the rest of the document (Page 1-4), EPA suggests that instead of listing only the 41 CEFLA sites in three categories, the 12 non-CERLCA sites should be included here as well and state that the 53 sites covered in this ROD are divided into four categories. Also, the ROD needs to make it clear that the all 53 sites are soil sites. If the ROD states that there are 6 shallow soil sites with hydrocarbon and metal contamination, does it imply that the 21 VOC sites and 14 NFA sites are not shallow soil sites? EPA suggests the following: · 21 soil sites with VOC and PAH contamination · 6 soil sites with fuel and metal contamination · 14 soil sites with levels of contamination that do not pose an adverse risk to human health or the environment · 12 non-CERCLA soil sites with aircraft engine exhaust stains. **Response:** The referenced paragraph has been revised as follows: "The 53 sites addressed in this ROD are divided into four categories described below: ■ 21 soil sites with volatile organic compounds (VOCs) and fuel hydrocarbons (VOC Sites) ■ 6 waste oil tank and OWS sites with fuel hydrocarbons, semi-volatile organic compounds (SVOCs) and metals (Waste Oil Tank and OWS Sites) ■ 14 no further action (NFA) sites where levels of contaminants do not present adverse risk to human health or groundwater quality (No Further Action Sites) ■ 12 CERCLA-exempt sites with aircraft engine exhaust stains on the taxiway (CERCLA-Exempt Sites)" The suggested addition of "PAH contamination" to the description of the VOC sites is not appropriate since no PAHs are identified as COCs for any of the SCOU ROD Part 2 sites. Additionally, the stains are located on the aircraft taxiway, and thus are not actually soil sites. Applicable section and site headings will be revised as appropriate given the changes to site category names.

Item	Page	Section	Comment
2	Page 1-3	Description of Selected Remedies	**Comment:** This section here should only describe the selected remedies for the 41 sites in this ROD. The current description along with Table 1-1 should be moved to Section 2.4 Scope and Role of The Operable Unit. Please see General Comment #1 for adding the suggested table following the discussion on Page 1-6. Also, please delete the last sentence of the first paragraph on Page 1-6 since it is confusing. **Response:** The description of Castle RODs and the associated Table 1-1 has been moved and integrated into Section 2.4. Please see the response to general comment #1 regarding the incorporation of the suggested table. The last sentence of the first paragraph on Page 1-6 has been removed.
3	Plate 1		**Comment:** The Plate should be titled as the SCOU ROD Part 2 Sites. The map indicates yellow colored sites as shall soil sites with excavation and off-site disposal. However, the yellow colored sites in the figure are both excavation sites and NFA sites while the figure does not denote the color for the 14 No Further Action sites (PCB sites are clear). Some sites (STA 34 & 35, B1532, SWMU 4.15, SWMU 3, 4.3) seem to be missing from the figure. Since many of the sites are very small on the map, too many markings in the vicinity make it difficult to locate the specific sites. EPA suggests only the SCOUR ROD Part 2 sites are marked on the figure. **Response:** The figure title has been revised to SCOU ROD Part 2 Sites and the figure now includes only the SCOU ROD Part 2 sites. Additionally, the color designations have been corrected to properly indicate the VOC, Tank/OWS, NFA and exempt sites..
4	Page 2-7	Section 2.2, Site History and Enforcement Activities, Last Paragraph	**Comment:** As noted in EPA's Specific Comment 1 on the Draft Final ROD, the text in the last complete paragraph describing the 32 sites that are excluded based on the CERCLA definition of a release, were excluded because they were contaminated only with petroleum hydrocarbons, not predominately with petroleum hydrocarbons as stated. Sites contaminated with petroleum hydrocarbons as well as CERCLA contaminants are not eligible for exclusion from CERCLA. **Response:** The word "predominately" has been removed.

Item	Page	Section	Comment
5	Page 2-7	Last sentence of the page	**Comment:** The last sentence implies that only the VOC sites had removal actions while many of the shallow soil sites as well as the no further actions such as the PCB sites also underwent excavation and off-site disposal under the removal process. Please clarify the statement. **Response:** As a result of the responses to Specific Comments 2, 6 and 9, the last paragraph of Section 2.2, including the referenced sentence on page 2-7, was removed from Section 2.2. The removed text was reorganized and consolidated into Section 2.4, Scope and Role of the Operable Unit. The referenced sentence was not included in the revised text of Section 2.4.
6	Page 2-8	SCOU Flow Chart, Second Step from the top	**Comment:** Please clarify which SCOU sites are addressed under CERCLA but not covered in the three SCOU RODs. **Response:** As indicated on the figure, there were 468 potential SCOU sites (including the two late additions) of which 233 were identified as SCOU sites. All 233 SCOU sites are addressed either in the SCOU ROD Part 1, SCOU ROD Part 2, LF ROD or CB Part 2 ROD. However, with the incorporation of Table 1-1 and associated text regarding Castle operable units into Section 2.4, Figure 2-2 will be deleted. Existing text at the end of Section 2.2 regarding operable units will be moved and integrated into Section 2.4.

Item	Page	Section	Comment
7	Page 2-9	Community Relation, Last Paragraph	**Comment:** What necessitated the SCOU Revise Proposed Plan if each of the 233 SCOU had been addressed in the original Proposed Plan? Also, please clarify why 3 of the 53 sites in this ROD were not included in the Revised Proposed Plan. Was it because the proposed remedies for these 3 sites remained unchanged from the original proposed plan while the rest of the 50 sites had their preferred remedies changed in the revised proposed plan? Also, EPA suggests deleting the first full paragraph on page 2-10 as the information has already been repeated several times in other parts of the ROD. **Response:** Due to additional investigation performed subsequent to the RI/FS and the development of the VOC RAO for groundwater protection, several of the preferred alternatives for the SCOU ROD Part 2 sites published in the 1997 *SCOU Proposed Plan* were modified. The *SCOU Proposed Plan* included proposed remedies for all 233 SCOU sites, some of which were conditional based on the need for additional data or technical evaluation. The Air Force published the *Revised Proposed Plan* to specifically reiterate or establish the proposed remedy for the 50 original SCOU ROD Part 2 sites after the data and technical evaluation conditions were addressed. The three SCOU ROD Part 2 sites that were not included in the *SCOU Revised Proposed Plan* were PCB-4, PCB-5, and PCB-6. The three PCB sites were included in the SCOU ROD Part 2 after publication of the *SCOU Revised Proposed Plan* when it was determined that additional sampling was required at the sites. Based on the additional sampling and the resultant Removal Action that was completed at PCB-4 and PCB-5, the remedy for the three sites has changed from Institutional Controls, as specified in the *SCOU Proposed Plan,* to No Further Action. In order to accommodate the above clarifications, the third paragraph of the referenced section has been revised as follows: "The *SCOU Proposed Plan* included some sites for which the proposed remedies were conditional on additional data collection or technical evaluation. In addition, at the time of the *SCOU Proposed Plan*, the VOC RAO for groundwater protection had not yet been established. The Air Force issued another proposed plan, the *SCOU Revised Proposed Plan* (Earth Tech, 2001), which specifically addressed the proposed remedies for 50 of the 53 SCOU sites included in this ROD. The *SCOU Revised Proposed Plan* was issued to reiterate or establish the proposed remedies for the 50 original SCOU ROD Part 2 sites after the data and technical evaluation conditions were addressed and the VOC RAO for groundwater

Item	Page	Section	Comment
			protection had been established. The other three SCOU ROD Part 2 sites (PCB-4, PCB-5, PCB-6) had been included in the *SCOU Proposed Plan* and were slated for the SCOU ROD Part 1. The sites were moved to SCOU ROD Part 2 because, after publication of the *SCOU Revised Proposed Plan*, agency comments were received on the SCOU ROD Part 1 that required additional characterization at the three sites. The *SCOU Revised Proposed Plan* was submitted February 12, 2001 to the RAB and the public for a 30-day comment period, and a public hearing was held at the Atwater City Hall Council Chambers on February 21, 2001. Responses to public comments on the *SCOU Revised Proposed Plan* are presented in the Responsiveness Summary provided in Section 3 of this document." The referenced paragraph on page 2-10 has been removed but please note that the text was added pursuant to EPA specific comment #4 on the Draft Final SCOU ROD Part 2.
8	Page 2-11	Section 2.4.1, Castle Operable Units	**Comment:** The final bullet item describing the objectives of the SCOU RI/FS should be revised to note that one of the objectives was to recommend preferred alternatives, not remedies. Remedies are not selected until the ROD. **Response:** The word "remedies" has been revised to "alternatives" in the final bullet item.
9	Page 2-12	First Full Paragraph	**Comment:** EPA suggests that the text after the first sentence be deleted as the discussion does not pertain to this ROD. **Response:** The referenced text will be removed. In accordance with previous comments and responses, Section 2.4 will be revised to include Table 1-1 and text regarding operable units from pages 1-3 and 2-7. It is anticipated that the Scope and Role of the Operable Unit will all be addressed within Section 2.4 without subsections.
10	Page 2-13	Section 2.6, Summary of Site Risks	**Comment:** Please correct the reference cited in the first paragraph here and in the text on page 2-14 for EPA's Risk Assessment Guidance for Superfund from U.S. EPA 1991, to U.S. EPA, 1989. In addition, the appropriate complete citation in the references should be U.S. EPA. 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual Part A, Interim Final (EPA/540/1-89/002). Office of Emergency and Remedial Response, Washington, D.C., rather than the Part B-Development of Risk-Based Preliminary Remediation Goals. **Response:** The citation has been corrected as suggested.

Item	Page	Section	Comment
11	Page 2-16	Section 2.6.1.1, HHRA Contaminants of Potential Concern	**Comment:** As noted in EPA's General Comment #6 on the Draft Final ROD, the phrase that total petroleum hydrocarbons represent classes of compounds not suitable for risk assessment should be revised to state that the TPH data were not suitable for quantitative risk assessment. **Response:** The phrase "the data for which are" has been inserted after "compounds" in the third sentence of the first paragraph after the bullets on page 2-16.
12	Page 2-20	Section 2.6.1.3, Toxicity Assessment, Second Complete Paragraph	**Comment:** The first sentence introducing Table 2-2 seems out of place. It would be more appropriate to note the target organs and critical noncarcinogenic effects following, rather than prior to, the discussion of noncarcinogenic effects and development of reference doses (RfDs). **Response:** The sentence introducing Table 2-2 has been moved to the end of the subject paragraph.
13	Page 2-21	Table 2-2, Chronic Toxicity Criteria for Contaminants of Potential Concern	**Comment:** Inasmuch as chronic toxicity criteria (i.e., RfDs) are not presented in this table, the title is misleading and should be changed to not that only target organs and critical effects are presented. **Response:** The title has been changed to "Target Organs and Critical Effects of COPCs".
14	Page 2-24	Section 2.6.1.4, Risk Characterization Last Paragraph	**Comment:** The statement in the paragraph that "Rfds (sic) are not established for lead since adverse effects may result from very low exposure levels" is incorrect and should be revised to state that RfDs for lead are not established because most human health effects data are based on measured blood-lead concentrations rather than on an estimated external dose. **Response:** The statement has been revised as follows: "RfDs for lead are not established because most human health effects data are based on measured blood-lead concentrations rather than on an estimated external dose."

Item	Page	Section	Comment
15	Page 2-25	Table 2-3, HHRA Results for SCOU ROD Part 2 Sites	**Comment:** Please provide an explanation why sites PCB 4, PCB 5, and PCB 6 are not listed in this table. In addition, several of the values presented in this table do not correspond with the summary of updated human health risk assessment results presented in Table 8 of Appendix E. Specifically, these sites are Building 51, Building 52, Building 53, Building 54, Sanitary Sewer 2, Sanitary Sewer 4, and Structure T66. It appears that this discrepancy is at least due in part to the fact that several of the values listed in Table 2-3 are results from the screening risk assessments conducted as part of the SCOU RI/FS. If this is the case, then the text in Section 2.6 should describe the risk screening process. Otherwise, please clarify the source of the risk assessment values for these seven sites. **Response:** The BHHRA results provided for B54 in Table 2-3 and Table 8 of Appendix C are the same (3E-8 and 0.001 for cancer risk and non-cancer hazard, respectively). For B51, B52, B53, SS-2, SS-4 and St-T66, Table 8 of Appendix C indicates that there were no updates to toxicity factors that affected the BHHRA. Therefore, the results provided for these sites in Table 2-3 are from the SCOU BHHRA. Appendix C provides the updated BHHRA values only for sites with COPCs that had changes in toxicity factors since completion of the BHHRA. Otherwise, the SCOU BHHRA results remain appropriate. BHHRA results for PCB-4, PCB-5 and PCB-6 have been added to Table 2-3.
16	Page 2-26	Table 2-4, Estimated Blood-Lead Concentrations	**Comment:** Please clarify why only four sites are presented in this table, while 30 sites are presented in Table 2-3. In addition, please clarify whether ND means lead was not detected at the site, or was not detected at concentrations exceeding its established threshold background value (TBV). **Response:** As stated in the text on page 2-24, last paragraph of Section 2.6.1.4: "Blood-lead levels were quantified only for DA-5, the only SCOU ROD Part 2 site where lead was detected." The following text has been appended to this sentence: "and determined to be anthropomorphic". The sites other than DA-5 have been removed from the table (now Table 2-5).
17	Page 2-27	Section 2.6.1.5, Uncertainty Analysis	**Comment:** The statement that the HHRA assumes complete exposure pathways when in fact many of the sites are covered with asphalt or concrete is not relevant to sites proposed for unrestricted reuse, and should be deleted. The need to maintain asphalt or concrete cover to mitigate potential exposure pathways represents an institutional control, which is not a part of the selected remedy for these sites. **Response:** The referenced statement will be deleted.

Item	Page	Section	Comment
18	Page 2-28	Section 2.6.2.1, Site Background Levels	**Comment:** The text in the first paragraph notes that because analytical methods generally cannot support a zero level, the method detection limit was established as background for organic analytes. However, the text in the following paragraph states that because several metals were not detected in background samples, the reporting limit was selected as the TBV. Please clarify whether the TBVs in these instances were established as the method detection limit or the reporting limit. **Response:** The referenced text has been revised to indicate that the method detection limit was used as the background level or TBV in the instances specified.
19	Page 2-47	Section 2.8.1.1 Building 51 Group	**Comment:** There is a minor discrepancy between the maximum concentration of TCE in the text (2,305 ug/L) and the bottom table (2,309 ug/L). Please correct. **Response:** The value in the table has been corrected to "2,305".
20	Page 2-63	Section 2.8.1.4, Building 1709 Site Characterization	**Comment:** The text in the first paragraph on this page states that trichloroethene (TCE), vinyl chloride, and 1,1-dichloroethene (1,1-DCE) were detected in soil gas samples. However, the text in the next paragraph states that additional sampling would be required to refine estimates of the extent of TCE and tetrachloroethene (PCE). Please clarify why PCE was determined to be of concern at Building 1709 when it was apparently not detected in soil gas, and why is was deemed not necessary to refine estimates of the extent of 1,1-DCE and vinyl chloride. **Response:** The text in parentheses in the first sentence of the second paragraph has been changed from "TCE and PCE" to "TCE, vinyl chloride, and 1,1-DCE".
21	Page 2-80	Section 2.8.1.7, Discharge Area 5, Human Health Risk Assessment	**Comment:** The text in this section refers to Appendix C for a discussion of the Henry's Law. However, Appendix C does not provide such discussion. Please clarify. **Response:** The text is not intended to reference a discussion of Henry's Law. It is intended to point out that the cancer risk value listed for DA-5 in Appendix C used a different Henry's constant for methylene chloride than was used to derive the human health risk based RAO for methylene chloride. The Henry's constants used for methylene chloride were 4.52E-02 atm-m^3/mol for the DA-5 cancer risk values and 1.85E+00 atm-m^3/mol for the human health risk based RAO. The third sentence of the section has been revised for clarity as follows: "The cancer risk value for DA-5 listed in Appendix C was calculated using a different Henry's constant for methylene chloride than was used to calculate the risk-based RAO for methylene chloride."

Item	Page	Section	Comment
22	Page 2-96	Table 2-10, Remedial Status of VOC sites	**Comment:** Under the Remedial Status column for sites Building 1709, Hangar F-4 and Sanitary Sewer 2, please indicate whether the selected remedies have been implemented at these sites and the purpose of the additional data collection. The current language implies that if the data didn't support SVE, another remedy may be selected. **Response:** As discussed in the March 19, 2003 RPM meeting, remedial status for these sites has been indicated as "Site is in design stage". Pursuant to general comment #1, the site status is indicated on the new table and Table 2-10 has been deleted.
23	Page 2-106	Section 2.8.3.4, SWMU 4.16 Site Characterization	**Comment:** According to the information presented in this section, soil samples were collected from three soil borings at SWMU 4.16 during the SCOU RI/FS, which was finalized in 1997. However, the associated figure for SWMU 4.16 shows only boring locations for borings installed during the investigation in 1999. Please indicate the SCOU RI boring locations on the figure for SWMU 4.16. **Response:** A figure depicting the locations of the SCOU RI borings has been included.
24	Page 2-113	Section 2.8.3.6, SWMU 4.22 Selected Remedy	**Comment:** Please clarify that excavation and off-site disposal will be implemented only if the planned confirmation sampling results indicate contamination present greater than the RAOs described in Section 2.7. **Response:** Upon reviewing this comment, the Air Force noted that the date of OWS removal was not included in the Site Description text. Since this comment was not specified for the other SWMUs, it is assumed that the absence of the OWS removal date may have led EPA to believe that no excavation had yet been done at SWMU 4.22. In fact, SWMU 4.22 was removed by excavation in 1996. The removal date has now been specified in the SWMU 4.22 Site Description text. Therefore, excavation has been done and more may be needed, but until a closure report is submitted, excavation (without the specified qualification) is the remedy.

Item	Page	Section	Comment
25	Page 2-124 and 2-125	Section 2.8.4.4, SWMU 4.7 Site Characterization	**Comment:** Although the text in this section states that toluene was detected in soil gas, along with trace levels of TCE, PCE, benzene, xylene, and Freon 113, only the results for toluene, Freon 113, and xylenes are presented in the table. Please include results for the additional analytes detected, or clarify why they should not be included in the table. **Response:** Toluene, benzene and Freon 113 were detected at concentrations above the reporting quantification limit and are included in the maximum detections table. TCE, PCE and xylenes were estimated values detected at less than the reporting quantification limit. The fifth sentence under site Characterization has been replaced with: "Low levels of toluene (up to 0.83 µg/L), benzene (up to 0.038 µg/L) and Freon 113 (up to 0.40 µg/L) were reported, in addition to trace concentrations of TCE, PCE and xylenes. "
26	Page 2-146	Section 2.11.2, Shallow Soil Sites	**Comment:** Please indicate what contaminants at SWMU 4.6, and SWMU 4.22 constitute the principal threat waste and whether the contaminants pose ad adverse threat to human health and/or groundwater. **Response:** There are no known contaminants present at SWMUs 4.6 and 4.22 that pose adverse risk to human health or groundwater. As described in the respective site summaries, confirmation sampling is required in order to determine the need for additional excavation. Section 2.11.2 has been revised to include the following: "Principal threat wastes at SWMUs 4.6 and 4.22 are the potential SVOC, VOC or metal contaminants that may pose a threat to human health and/or groundwater in soil below the OWS units. Confirmation sampling is planned at SWMUs 4.6 and 4.22 to identify the presence of COCs and principal threat wastes."

Item	Page	Section	Comment
27	Page 2-146 and 2-147	Section 2.12, Selected Remedy	**Comment:** The section should state whether the selected remedies will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use, and whether or not a five-year review will be required. **Response:** The last sentence of the fourth paragraph of section 2.12.1 (VOC Sites) reads: "Thus, implementation of the selected remedy will reduce contaminant concentrations to levels that no longer constitute a principal threat to human health or groundwater, allowing for unrestricted land reuse." The last sentence of Section 2.12.2 (Shallow Soil Sites) reads: "Excavation and disposal will reduce contaminant concentrations to levels that no longer constitute a principal threat to human health or groundwater, allowing for unrestricted land reuse." The discussion of the five-year review is presented in Section 2.13.2, Five-Year Review.
28	Page 2-148 to 2-151	Table 2-15, Evaluation of Selected Remedy, VOC Sites	**Comment:** The selected remedy listed in this table for Building 1532 is soil vapor extraction; however, Table 1-1 and Section 2.8.4.1 note that the selected remedy for Building 1532 is no further action. Please delete Building 1532 from Table 2-15. **Response:** Building 1532 has been deleted from Table 2-15.
29	Page 2-154	Last Full Paragraph	**Comment:** A statement is made that non-promulgated standards, guidelines, and criteria to be considered (TBCs) may also guide cleanup actions. If such TBCs were utilized in this ROD, then this sentence should be followed with a sentence stating that these TBCs were utilized and are now designated as performance standards in this ROD and will be complied with. If no TBCs were utilized, then either delete the reference to TBCs or state there were none that were utilized in this ROD. It is Region 9's policy not to list TBCs in RODs. **Response:** The third sentence of the referenced paragraph will be deleted. In addition, the phrase "the RAOs specified in Section 2.7 are chemical-specific TBC criteria that are protective of groundwater quality and human health" located in the first sentence of the paragraph beginning at the bottom of p. 2-155, will also be deleted.

Item	Page	Section	Comment
30	Page 2-156	Section 2.13.1.1, Last Paragraph	**Comment:** The sentence starting with "Because the SVE and excavation and off-site disposal...." is not clear. Does it mean that the action-specific ARARs for the SVE sites and the excavation sites are the same? There may be some common ARARs but there are also different ARARs that would apply to these different activities. Please clarify the statement. **Response:** The sentence was rewritten as follows for clarity: "Because the SVE and the excavation and off-site disposal sites will involve similar site intrusive activities (i.e., soil excavation, drilling, and SVE well installation) and have similar site contaminants, they share many of the same waste management, wastewater discharge, and air emissions ARARs."

Item	Page	Section	Comment
31	Page 2-158, Table 2-18	First Row	**Comment:** First, under ARAR status, please revise the sentence to read: "Applicable or Relevant and Appropriate to SCOU ROD Part 2...." because some RCRA regulations are identified as relevant and appropriate. Both the Description and Comment column need to be rewritten as they are confusing. EPA suggests revising the Description Column to read: "Identifies those waste that are subject to regulation as hazardous wastes. Excavated contaminated soil must be classified using generator knowledge or waste analysis. If, based on generator knowledge, the soil contains a listed hazardous waste, then the soil is considered hazardous based on EPA's "contained-in policy." If based on waste analysis, i.e, the soil fails the RCRA characteristic test, the soil is considered hazardous. In both instances, the hazardous soil must be managed as hazardous waste and the soil must be treated, stored, disposed of in accordance with the RCRA regulations that are listed below." Under Comment Column, EPA suggests revising the sentence to read: "In this site, the Air Force has no definitive knowledge that the soil contains a listed hazardous waste. Nevertheless, because the COC in the soil is similar to a listed hazardous waste, the Air Force considers the EPA contained-in policy relevant and appropriate. The Air Force will therefore comply with the relevant and appropriate RCRA treatment and storage requirements. Although not technically an ARAR because it applies to an activity offsite, the Air Force will comply with the offsite rule in disposing of the soil offsite. **Response:** The ARAR status has been changed to "Applicable or Relevant and Appropriate to SCOU ROD Part 2....". The Description column text has been revised as suggested. The Comment column text has been revised as suggested with revision to the second and third sentences as follows: "Nevertheless, in certain circumstances, such as when the COC or detected concentration in the soil is similar to a listed hazardous waste, the Air Force may consider the EPA contained in policy relevant and appropriate. Where it is relevant and appropriate, the Air Force will comply…".

Item	Page	Section	Comment
32	Page 2-158, Table 2-18	Second Row	**Comment:** If the SVE systems have catalytic or thermal oxidation, the RCRA incinerator regulations are relevant and appropriate and need to be included in the Table. **Response:** All of the SCOU ROD Part 2 SVE sites will implement carbon adsorption for vapor treatment. Therefore, incinerator requirements are not applicable or relevant and appropriate. Federal regulation 64 FR 52828 has been removed as an ARAR from SCOU ROD Part 2. The following text has been added under Clean Air Requirements, page 2-176: "The SCOU ROD Part 2 SVE sites will implement carbon adsorption for vapor treatment." The first bullet under New Source Review (Rule 2201) on page 2-177 pertaining to thermal and catalytic oxidizers has been deleted. Additionally, the 1st bullet on page 2-137 has been revised as follows: "Contaminated vapors are treated at the surface; at the SCOU ROD Part 2 sites, the vapors will be treated using carbon adsorption. The spent carbon filters will be disposed of off-site."
33	Page 2-159, Table 2-18	First Row	**Comment:** EPA suggests adding "relevant and appropriate" to the ARAR status column and rewrite the Comment Column using the language suggested above under the Description and Comment Columns. **Response:** See responses to Comment #31 above. "Relevant and appropriate" will be added to the status column and the Description and Comment text will be revised in accordance with the response to specific comment #31.
34	Page 2-160, Table 2-18	Third Row	**Comment:** EPA suggests adding the following sentence in the "ARAR Status:" "However, if the contaminated soil is excavated and "placed" elsewhere, the soil must be classified." **Response:** The text in the ARAR Status column was moved to the Description column, and the text in the Description column was moved to the Comment column. The following text was added to the ARAR Status column: "Applicable to excavated soils."

Item	Page	Section	Comment
35	Page 2-162, Table 2-18		**Comment:** Please provide a rationale as to why CAMU regulations are mentioned here. If the Air Force plans to designate a CAMU at Castle, new CAMU regulations effective April 22, 2002 will apply to CAMUs that have not been grandfathered under the old CAMU regulations. We should decide what we will designate those areas where we are placing, treating or temporarily storing remediation waste to avoid LDRs. We can designate these areas as CERCLA Area of Contamination (if the facts support this), or a staging pile, or a CAMU. The new regulations have new requirements for CAMUs, depending on whether the CAMU will be used for disposal or only for treatment and storage. California has the interim authorization for the new CAMU regulations. **Response:** References to CAMU regulations have been removed from SCOU ROD Part 2. Remediation wastes stored onsite will be managed within the CERCLA AOC.
36	Page 2-163, Table 2-18		**Comment:** In the Description Column, third line, change the word "accept" to "except." **Response:** The word "accept" has been changed to "except".

Item	Page	Section	Comment
37	Page 2-164, Table 2-18	Second Row	**Comment:** Under ARAR Status, EPA suggests revising the sentence to read: "Applicable to sites where soil will be excavated and disposed offsite and to other remediation wastes that have hazardous constituent concentrations greater than the treatment standards listed in this section". Under Description Column, EPA suggests the following revisions: "LDR Phase IV Final Rule, (63 FR 28555-28603, 5/26/98) requires that soils be treated by reducing the hazardous constituent levels by ninety percent unless such treatment would result in concentrations that are less than ten times the relevant Universal Treatment Standards (UTS), in which case treatment would be capped at ten times the UTS. Hazardous remediation wastes, i.e., wastes generated during excavation or during well installation, will be managed in accordance with this requirement. Hazardous debris will be treated using the LDR treatment standards for hazardous debris at 40 CFR 264.45". In the ARAR Status Column, it states that this requirement will apply to both the excavated soil that will be disposed offsite and to other remediation wastes. Will the excavated soil be treated to comply with LDRs before the soil will be disposed offsite? Please clarify. **Response:** In response to the first comment, the following phrase from the text under ARAR status has been deleted: "(contained-in or contained-out)." In response to the second comment about the Description column, the text concerning hazardous soil and debris were rewritten as follows: "LDR Phase IV Final rule (*63 FR 28555-28604*, 5/26/98) requires that that soils be treated by reducing the hazardous constituent levels by ninety percent unless such treatment would result in concentrations that are less than ten times the relevant Universal Treatment Standards (UTS), in which case treatment would be capped at ten times the UTS. Hazardous remediation wastes, i.e., wastes generated during excavation or during well installation, will be managed in accordance with this requirement. Hazardous debris will be treated in accordance with treatment standards in 40 CFR 264.45, which are based on decontamination technologies listed in this section." The text concerning remediation wastes was left as is, since remediation wastes such as decon water, development water, and disposable equipment were not explicitly addressed in the LDR Phase IV Final rule and do not otherwise have specific LDR treatment standards.

Item	Page	Section	Comment
38	Page 2-165, Table 2-18	Second Row	**Comment:** What standards are been referred to? Are these the standards required for shipping hazardous waste and thus the reference to manifest forms, packaging etc. in the Description column? Or are these the standards for accumulating hazardous waste on site? Please clarify. Also, please delete reference to CAMUs if it is not relevant. **Response:** The term "standards" used in the Requirement, Criterion, or Limitation column is taken directly from the title of this particular section of the CCR. The standards apply generally to any hazardous waste as described in the "Description " column, and are not necessarily applicable only to shipping or storage. The reference to CAMUs has been deleted.
39	Page 2-171	Federal and California Waste ARARs, First Bullet	**Comment:** Please clarify whether this refers to the sites where SVE will be employed or the sites which will be excavated and disposed offiste. Please delete reference to TBCs (See comment regarding TBCs above). **Response:** The following text has been appended to the first bullet: "regardless of remedial technology". The reference to WQSA thresholds (i.e., TBCs) has been deleted.
40	Page 2-172	Waste Classification ARARs	**Comment:** Based on the EPA's "contained-in policy" comment above, we suggest that the discussion on the page be revised. In short, there will be two tests to determine if the soil is contaminated: 1) through waste analysis; and 2) through the application of the EPA contained in policy which is applicable only if we know (based on generator knowledge) that the soil contains a listed waste. In the absence of this generator knowledge, we may still decide the contained in policy is relevant and appropriate because the waste in the soil is like a listed RCRA waste. In both cases (the soil is hazardous because it fails the characteristic test or because of the contained in policy), the soil will be managed as a hazardous waste. The LDRs apply to the soil that we conclude is hazardous based on either of this test. **Response:** Please see response to specific comment #31. The last paragraph on page 2-172 has been deleted and replaced with the text provided for specific comment #31.

Item	Page	Section	Comment
41	Page 2-173	Waste Management ARARs	**Comment:** Based on EPA's comment on the CAMU regulations, we suggest that this section to be revised. Please clarify what TUs are. Are these the SVEs? If so, please state explicitly and explain what requirements will be applied to the SVE units. The discussion refers to staging piles and AOCs. Please clarify which type it is used here where it is staging pile, AOC or CAMU. **Response:** Please see response to comment #35. References to CAMU regulations have been removed from SCOU ROD Part 2. As a result, the references to TUs and staging piles have also been removed. Remediation wastes stored onsite will be managed within the CERCLA AOC.

RESPONSE TO REVIEW COMMENTS GIVEN BY CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Document: **Castle Airport Source Control Operable Unit, Record of Decision, Part 2, Final, February 2003.**

Responses prepared by: **Earth Tech, Inc.**
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General Comments

Item	Page	Section	Comment
1	Page 2-43	Section 2.8.1	**Comment:** The master schedule indicates that soil vapor extraction systems (SVE systems) will still be operating when the Air Force and the regulatory agencies sign SCOU ROD 2. Additionally, according to the most recent schedule the Air Force plans to submit Finding of Suitability to Transfer (FOST) documents for the parcel impacted by these SVE systems in June 2003. Based on the above information DTSC recommends the following language be incorporated into this section. *The Air Force will retain ownership of the property where SVE systems are currently operating or will be operating in the future until the systems have creased (sic) to operate and a final closure report has been approved by the agencies.* Otherwise, institutional control language, including discussion of the inclusion of DTSC covenant will need to be incorporated into SCOU ROD 2. DTSC is requesting this action be taken to prevent the SVE systems from being damaged, and to protect future residents and tenants from being exposure to hazardous substances remaining in the vadose zone. This is consistent with DTSC policy that requires properties being transferred without institutional controls are free of contamination above the remedial action objectives. **Response:** Based on discussions in the March 19, 2003 RPM meeting, the suggested language will be revised to allow for the adoption of suitable institutional controls if the Air Force chooses to transfer the property affected by ongoing or planned SVE operations. The suggested language, which would be included in Section 2.8.1 and 2.12.1, is as follows: *Where SVE systems are currently operating or will be operating in the future, the Air Force will either retain ownership of the property until the systems have ceased to operate and a final closure report has been approved by the agencies, or will adopt suitable institutional controls that protect building residents and the operating systems until closure is achieved.*

Item	Page	Section	Comment
2	Page 2-90	Section 2.8.1.9	**Comment:** The text of the document states that the selected remedy for site SS-2 is soil vapor extraction (SVE). As stated in table 2-10 data collection to support SVE is ongoing. There is no doubt this is due to the fact that SS-2 is being evaluated in the SVE Decision Study. DTSC recommends that Air Force explain the START process and how it is an integrity part of the selected remedy. Additionally, the fact that further SVE may not be performed at the site based on the results of START evaluation should be included in the text also. **Response:** The last 2 paragraphs of Section 2.7 (RAOs) have been revised as follows to include discussion of the START process: "When VOC concentrations are less than VLEACH2 thresholds, then remedial action for VOCs on the basis of groundwater protection is not required. When VOC concentrations at a site exceed the VLEACH1 thresholds then SVE, as the presumptive remedy for VOCs in soil, is included in the site remedy. When VOC concentrations fall between the VLEACH1 and VLEACH2 thresholds, a site-specific analysis is conducted to determine if SVE is appropriately included in the site remedy. The analysis includes detailed decision criteria agreed upon by the Air Force, U.S. EPA, DTSC, and CVRWQCB to initiate or terminate SVE activities on a site-specific basis. The initiation criteria are referred to as the SVE Turn-on And Remediation Test (START), and the termination criteria are referred to as the SVE Termination or Optimization Process (STOP). The START and STOP evaluations integrate scientific, economic, and engineering judgment to answer the following decision criteria: I. Will the contaminant mass in the vadose zone reach the groundwater? II. Will the contaminant mass in the vadose zone cause the contaminant concentrations in the leachate to exceed the aquifer cleanup level? III. Is it appropriate to install and operate (START), or terminate (STOP), an SVE system at this site? If the answer to criterion I or II is no, then SVE is either not required, or can be terminated, and site closure proceedings can be initiated. Detailed START and STOP criteria are provided in Appendix D. VLEACH2 values were not established as the groundwater protective RAOs due to the technical and economic uncertainty of attaining them. Attainment of the groundwater protective RAO for VOCs when VLEACH2 values cannot be attained by SVE is determined the STOP evaluation.

Item	Page	Section	Comment
2 (continued)			The START and STOP evaluations are initiated at a site where SVE is part of the remedy when, among other criteria, VOC concentrations at the site do not, or no longer, exceed the human health RAOs for VOCs, (i.e., the site does not pose an unacceptable risk to human health from VOC contaminants)." The Selected Remedy header for B1709, Hangar F-4, and SS-2 has been revised as follows: "The FS [Data Gap Investigation for SS-2] evaluated alternatives to address TCE [VOCs for F-4 and SS-2] in excess of WQSA thresholds. The selected remedial alternative for B1709 [F-4, SS-2] is SVE as specified in the *Revised Proposed Plan* and discussed in Section 2.12 of this ROD. SVE system design, including data gathering via a small scale SVE system is currently being performed at B1709 [F-4, SS-2] in accordance with the *SVE Decision Study Work Plan* (Earth Tech, 2000b) approved by the BCT. Completion of a site-specific START analysis will determine if SVE must be continued or can be terminated. Implementation of the selected remedy at B1709 [F-4, SS-2] will reduce concentrations of TCE (and cis-1,2-DCE at SS-2 and PCE at F-4) to levels that no longer pose an adverse risk to groundwater quality.
3	Page 2-96	Table 2-10	**Comment:** This table listed the remedial status of volatile organic compounds (VOC) sites. The remedial status listed for sites B1709 and Hangar F-4 is *data collection to support SVE is ongoing*. However, the text in sections 2.8.1.4 and 2.8.1.8 states the SVE Decision Study evaluations for these sites have been completed. DTSC recommends the Air Force clarify the status of these sites by revising the table or the text in these two sections mentioned above. **Response:** As discussed in the March 19, 2003 RPM meeting, the Table 2-10 entries for the remedial status of sites B1709, Hangar F-4 and Sanitary Sewer Segment 2 is: "Site is in design stage". Pursuant to EPA general comment #1, a new table has been added to the Declaration that specifies, among other information, remedial status of the SCOU ROD Part 2 sites. Remedial status of B1709, F-4, and SS-2 is indicated as "Site is in design stage" on the new table. Table 2-10 has been deleted.

Item	Page	Section	Comment
4	Pages 2-133, 2-134, 2-135 and 2-136	Section 2.8.4.11, 2.8.4.12 and 2.8.4.13	**Comment:** The text states that sites PCB 4 and 5 were closed under Toxic Substances Control Act (TSCA). The next sentence in the same text describes a Phase 1 investigation in 2002. However, there is no explanation as to why the sites were being reinvestigated. DTSC recommends that an explanation be provided that the sites were reinvestigated due to provisions in Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Also later in the text within this section 10 mg/kg is referred to as the remedial action objective (RAO). The RAO at these sites is 2.2 mg/kg. DTSC recommends that the Air Force revised the text and state clearly what the RAO is at these sites. **Response:** The first sentence, second paragraph under Site Characterization for PCB-4, PCB-5, and PCB-6 has been revised as follows: "PCB -4 [PCB-5, PCB-6] had originally been included in the SCOU ROD Part 1 as a No Further Action site. However, based on comments received from the DTSC on the SCOU ROD Part 1 regarding the adequacy of site characterization relative to CERCLA decision criteria, additional investigation was conducted at PCB-4 [PCB-5, PCB-6] in accordance with an approved Work Plan (JEG, 2002e). Subsequent excavation was performed at PCB-4 [PCB-5] in accordance with an approved Removal Action Memorandum (JEG, 2002g)." (Please note that the sentence regarding excavation is not applicable to PCB-6). The text does not refer to 10 mg/kg as a RAO; the value is provided in reference to PCB concentrations detected at PCB-4 during the Phase I RI. The sentence will be revised for clarity, as follows: "The results indicated that PCB concentrations of up to 10 mg/kg were detected but were confined to the area of the former transformer pad (JEG, 2002f)." The subsequent paragraph describes the excavation performed as a result of the PCBs detected during the Phase I RI, and states that confirmation sampling results were below RAOs. The HHRA RAO for PCBs is listed as 0.210 mg/kg on Table 2-8.
5	Page 2-136	Section 2.9	**Comment:** The START/STOP process should be listed as an integrity part of the treatment and removal methods used at VOC sites that are described in this section. DTSC recommends adding this process to the list steps taken to achieve cleanup at VOC sites. **Response:** Section 2.9 provides descriptions of the remedial technologies evaluated in the SCOU FS. It does not list steps taken to achieve closure at VOC sites. However, as explained in the response to comment #2, discussion of the START process has been incorporated into the discussion of RAOs provided in Section 2.7.

Item	Page	Section	Comment
6	Page 2-179	Section 2.14	**Comment:** The text in this section discusses discrepancies between the SCOU Revised Proposed Plan (Proposed Plan) and the SCOU ROD 2 due to the fact some of the selected remedies proposed in the SCOU ROD 2 have been completed already as removal actions. The current selected remedy for these sites is no further action. Sites PCB 4, 5 and 6 are discussed in this section. The text states that the preferred remedy in the Proposed Plan was institutional controls. A review of the text in the Proposed Plan shows that PCB 4, 5 and 6 were no further action sites to be discussed in SCOU ROD, part 1. DTSC recommends the Air Force revised the text in this section of the SCOU ROD 2. DTSC does not believe it is necessary to revise the Proposed Plan because the Air Force followed the requirements for public notice during the removal action memorandum phase of the removal action project. **Response:** The preferred alternative for PCB-4, PCB-5, and PCB-6 is specified as Institutional Controls in the *SCOU Proposed Plan*, dated August 15, 1997. Please see Table 6, Summary of Alternatives, page 20, in the *SCOU Proposed Plan*.

4.0 STAINS

Stains 33 through 44 were investigated under the CAFB IRP and are described and evaluated in previous RI/FS documents. However, as described in Section 2.14, the stains are the result of aircraft emissions and therefore, as described in Definition 22, CERCLA Section 9601, are not subject to the provisions promulgated by CERCLA. Although exempt from CERCLA, the stains are subject to applicable RCRA and State of California laws and regulations, including those for protection of groundwater quality. The 12 stains are listed and described below.

Stains (12 Sites)			
Stain 33	Stain 36	Stain 39	Stain 42
Stain 34	Stain 37	Stain 40	Stain 43
Stain 35	Stain 38	Stain 41	Stain 44

Stains 33 through 44 are aircraft blowdown/parking apron stains identified from an aerial photo analysis and visual inspection. These stains represent areas where combusted jet fuel was blown out from aircraft engines or where incidental spills from aircraft fueling/maintenance operations at designated parking locations were released on concrete. The stains are located on the west flight line sector. The stains have been generated over many years, and the action of wind and water has complicated the dispersion characteristics of non-volatile contaminants originally generated in the stains. Samples were collected from stains on concrete and from soils at unpaved runoff target areas off the parking apron away from the visible stains to evaluate the potential completion of the pathway to soil (for ingestion and possible infiltration to groundwater). Of the 12 stains, all but Stains 38 and 44 are on approximately three feet of reinforced concrete. The unpaved buffer strips beyond the apron are composed mainly of silty sand and native grasses, graded to direct surface water runoff to a storm drain system grating.

Samples were collected from Stains 11 and 41 and considered representative for all stains. Surface concrete scrapes contained up to 130 mg/kg of benzo(a)pyrene, 210 mg/kg of benzo(f)fluoranthene, and 286 mg/kg of lead. The hand auger samples of soil adjacent to the apron did not contain elevated concentrations of PAHs or metals.

5.0 REFERENCES

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APPENDIX A

PLATE 1: SCOU SITE LOCATIONS

PARTIALLY SCANNED
OVERSIZE ITEM (S)

See Document # 156418
for partially scanned image(s).

For complete version of oversize document(s),
see paper copy.

OVD-parent

APPENDIX B

ADMINISTRATIVE RECORD INDEX

CASTLE AFB
CALIFORNIA

ADMINISTRATIVE RECORD INDEX (CHRONOLOGICAL)

September 2002

LIST OF COMMON ACRONYMS

AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AR	Administrative Record
BRA	Baseline Risk Assessment
CAR	Contamination Assessment Report
CDAP/QAPP	Chemical Data Acquisition Plan/Quality Assurance Project Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEV	Environmental Management Flight
CDHS	California Department of Health Services
CDTSC	California Department of Toxic Substances Control
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act
DERA/DERP	Defense Environmental Restoration Account/Program
DOD	Department of Defense
DPM	Defense Priority Model
DSMOA	Defense and State Memorandum of Agreement
EE/CA	Engineering Evaluation/Cost Analysis
FFA	Federal Facilities Agreement
FS	Feasibility Study
HRS	Hazard Ranking System
HSP	Health and Safety Plan
IR	Information Repository
IRA	Interim Remedial Action
IRP	Installation Restoration Program
MOA/MOU	Memorandum of Agreement/Understanding
NPL	National Priorities List
OU	Operable Unit
PA	Preliminary Assessment
RA/RAP	Remedial Action/Remedial Action Plan
RAB	Restoration Advisory Board
RACER	Remedial Action/Cost Estimating and Risk Model
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SACM	Superfund Accelerated Cleanup Model
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SC	Site Closeout
SHERP	Safety and Health Emergency Response Plan
SI	Site Inspection/Site Investigation
SWMU	Solid Waste Management Unit
TRC	Technical Review Committee
UST	Underground Storage Tank

COVER SHEET

Responsible Agency: U.S. Air Force

Action: The Air Force Base Conversion Agency (AFBCA) has established Administrative Record (AR) files at AFBCA bases. The AR files are being prepared in accordance with the requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). The index for the administrative record is a listing of documents contained in the administrative record file.

The administrative record file is compiled as work on the Installation Restoration Program (IRP) sites progress, and it shows the basis for the selection for a response action. The administrative record file also serves as a vehicle for public participation since a copy of the record is legally required to be available for public review at a repository at or near the site.

Purpose and Need: To provide administrative support for the Installation Restoration Program (IRP) at AFBCA bases and to meet the policies for programming guidance detailed by Air Staff in their letters of 12 Jan 88 and 15 Apr 92. Section 113(k) of CERCLA, as amended by SARA, requires the development and retention of documentation for IRP sites at which a response action is planned or ongoing. Executive Order 12580 delegates to the Secretary of Defense the responsibility for establishing this AR file for DoD sites. The AR serves two primary purposes: the record establishes the documentary basis for selection of a response action for each site, and the record ensures public participation in the process of response selection.

The administrative record index provides a listing of documents relevant to the decision process for a response action and public participation in the process.

For further information contact: Mr. Jerry Cleaver, AFBCA/EV, 1700 North Moore St, STE 2300, Arlington, VA, 22209-2802 at DSN 226-5539 or COMM 703-696-5536.

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SECTION 1
INTRODUCTION

ADMINISTRATIVE RECORD FILE AND INDEX

INTRODUCTION

The Air Force Base Conversion Agency is conducting Installation Restoration Program (IRP) activities at Castle Air Force Base (AFB), CA. The purpose of the IRP is to identify, evaluate, and clean up (remediate) any former disposal or spill sites that may contain hazardous materials.

Under section 113(k) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), federal facilities are required to establish an administrative record (AR) for every CERCLA response action, and to make a copy of the record available for public review. The AR file is an AR in progress and is compiled as work on the site progresses and shows the basis for the selection of a response action.

The public version of the AR file, which is on CD-ROM disks, will be considered a non-circulating reference document. This will allow the public greater access to the AR documents, and will minimize the risk of loss or damage. Individuals may print any documents contained in the record file, according to the printing procedures at the library.

Section 2 of the AR index is a short listing of documents by date, author, and subject/title contained in the AR file which is located at the base environmental office. All of the documents are listed in the index by chronological order; thus, the documents will not appear in document-by-document order. The date the index was prepared appears in the title of the report.

The AR will be maintained by the base. Periodically, supplemental material will be added to the AR file. As documentation is added to the record, the AR index will be updated by the base.

DOCUMENT INFORMATION

The information, also known as "data fields" or "fields", extracted from each document includes:

- *AR/IR File Number/CD Number*: A unique number, which identifies a specific document and the CD-ROM disk number where it is located.

- *Document Date*: The date of the document.
- *Author*: Name of individual author(s).
- *Author Affiliation*: Agency or affiliation of the author.
- *Corporate Author*: Agency or affiliation with the author.
- *Subject/Title*: Title, subject, or description of the document.

SECTION 2
AR DOCUMENTS

Castle AFB, CA - AR DOCUMENTS
Sorted by: Document Date and AR/IR File Number
Date of Report: 09/27/02

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
28 Jan 83	HQ SAC Letter to Base Concerning Commencement of Phase I, Records Search, TCE Contaminated Groundwater	Rasmussen, George R HQ SAC/DEP	02 CD 2
14 Mar 83	Base Letter to CRWQCB Concerning TCE Groundwater Investigation	Page, Aaron, Col 93 CSG/CC	06 CD 2
31 May 83	HQ AFESC Message to HQ SAC Concerning Implementation of Program	HQ AFESC/DEV	03 CD 2
09 Jun 83	Phase I, Pre-Performance Meeting Minutes	Mangan, Chuck Engineering-Science, Inc.	05 CD 2
02 Sep 83	Base Letter to HQ SAC Concerning Phase I, Review	Hedrick, Stephen P, Capt 93 MG/SGPB	07 CD 2
Oct 83	Phase I, Records Search Report	Engineering-Science, Inc.	08 CD 2
19 Oct 83	CDHS Letter to MDPH Concerning Surveys for Abandoned Hazardous Waste Disposal Sites	Bailey, Thomas E California Department of Health Services	16 CD 2
04 Jan 84	HQ SAC Letter to USAF OEHL Concerning Phase I, Final Report Completion and Request for Phase II to Begin	Burnett, Ronald D, Col HQ SAC/SGPB	10 CD 2
04 Jan 84	CDHS Letter to HQ SAC Concerning Phase I Completion and Phase II Progression	Sandhu, Mohinder S California Department of Health Services	11 CD 2
04 Jan 84	CRWQCB Letter to Base Concerning Review of Phase I, Report	Wolfson, James B California Regional Water Quality Control Board	12 CD 2

Castle AFB, CA - AR DOCUMENTS
Sorted by: Document Date and AR/IR File Number
Date of Report: 09/27/02

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
16 Jan 84	Base Letter to HQ SAC Concerning Community Understanding and Support for Phase II	Astorino, Loring R, Col 93 BMW/CC	13 CD 2
02 Feb 84	Base Letter to HQ SAC Concerning TCE Sample Results Collected from Wells 1-4 and Four Distribution Points, Jan 84	Hedrick, Stephen P, Capt 93 MG/SGPB	14 CD 2
03 Feb 84	Base Letter to CRWQCB Concerning Estimated Timetable for Phase II	Dempsey, Robert E, Col 93 BMW/CV	15 CD 2
15 Feb 84	Base Letter to CRWQCB Concerning Public Hearing	Astorino, Loring R, Col 93 BMW/CC	1019 CD 4
28 Feb 84	Phase II Presurvey Meeting Minutes	Hedrick, Stephen P, Capt 93 MG/SGPB	18 CD 2
Mar 84	Phase II, Problem Confirmation and Quantification Presurvey Report, Vol I, Technical Work Plan	Roy F Weston, Inc.	17 CD 2
05 Mar 84	Water Analysis Results, Wells 1-9 and 11, 12-18, and Four Distribution Points, 02 Feb 84	93 MG/SGPB	19 CD 2
05 Mar 84	RPM Meeting Minutes, 28 Feb 84	Hedrick, Stephen P, Capt 93 MG/SGPB	32 CD 2
26 Mar 84	TCE Sample Results, 24 Oct 83-06 Mar 84	93 MG/SGPB	20 CD 2
26 Mar 84	TCE Sample Results, Mar 84	93 MG/SGPB	21 CD 2

Castle AFB, CA - AR DOCUMENTS
Sorted by: Document Date and AR/IR File Number
Date of Report: 09/27/02

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
01 May 84	TCE Sample Results, Apr 84	93 MG/SGPB	1018 CD 4
Jun 84	SOW, Phase II, Construct Water Line, Located at Wallace Road and Nearby Hospital Road	AFCEE/ESB	906 CD 3
04 Jun 84	TCE Sample Results, May 84	93 MG/SGPB	22 CD 2
18 Jun 84	Phase II, Stage 1, Task Description and Presurvey Report	HQ SAC/SGPB	25 CD 2
27 Jun 84	TCE Sample Results, Jun 84	93 CSG/DEEV	23 CD 2
17 Jul 84	HQ SAC Letter to CRWQCB Concerning Base Activity	Hauver, Robert C, Col HQ SAC/SG	24 CD 2
24 Jul 84	MDPH Letter to HQ SAC Concerning Review of Phase II, Stage 1	Norman, William F Merced County Department of Public Health	26 CD 2
28 Aug 84	HQ SAC Letter to USAF OEHL Concerning Comments on Phase II, Stage 1, Task Description	Burnett, Ronald D, Col HQ SAC/SGPB	27 CD 2
09 Nov 84	Base Memorandum Concerning PCB Sample Results, BCE Storage Yard and Bldg 136	Davis, Merritt G, Jr, Col 93 MG/SGPB	28 CD 2

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
31 Dec 84	Newspaper Article, Various Articles Concerning Base Cleanup	The Atwater Signal The Merced Sun Star The Valley Bomber The McClatchy News Service The Fresno Bee The Merced Sun Star	29 CD 2
18 Feb 85	Soils and Ditch Sediments Lab Reports	Roy F Weston, Inc.	31 CD 2
20 Mar 85	Toxicology Summary Report	Weston Analytical Laboratories	34 CD 2
19 Apr 85	TOC and Phenols Results - Water Samples	Weston Analytical Laboratories	35 CD 2
11 Aug 85	Base Letter to CRWQCB Concerning Inspection and Annual Review of ISD Groundwater Monitoring Program	Snow, Verne L 93 CSG/DEEV	36 CD 2
06 Sep 85	Contamination Investigation and Sampling of Transformers and Tanks Corrosion Control Facility Report	Harding-Lawson Associates	37 CD 2
Nov 85	Phase II, Stage 1, Confirmation and Quantification Technical Report, Vol I of II	Roy F Weston, Inc.	38 CD 2
Nov 85	Phase II, Stage 1, Confirmation and Quantification Report, Vol II of II, Appendices	Roy F Weston, Inc.	39 CD 2
Nov 85	Newspaper Article, "Meeting Today on TCE in Mobile Home Park"	De La Cruz, Mike The Merced Sun Star	47 CD 2
Nov 85	Base Letter to Regulators Concerning Information Requested at RPM Meeting	Cole, John R, LtCol 93 BW/CVE	180 CD 2

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
12 Nov 85	Cleanup and Abatement Order Schedule	93 CSG/CC	41 CD 2
17 Dec 85	MDPH Letter to HQ SAC Concerning Review of Phase II, Stage 1	Norman, William F Merced County Department of Public Health	43 CD 2
22 Jan 86	Base Letter to HQ SAC Concerning Request for Initiation of Phase IVA Action Coordination Meeting	Buzak, Jan, Dr Kaiser, Donald W, LtCol 93 CSG/DE	44 CD 2
24 Jan 86	HQ SAC Memorandum Concerning Meeting on Groundwater Cleanup	Brown, Douglas, Maj HQ SAC/DEPV	45 CD 2
31 Jan 86	Newspaper Article, "CAFB Will Fund New Water Well"	De La Cruz, Mike The Merced Sun Star	33 CD 2
05 Feb 86	Phase IV Coordination Meeting Minutes, 29 Jan 86	Kaiser, Donald W, LtCol 93 CSG/DE	46 CD 2
23 Apr 86	EPA Comments on Phase IVA RA Plan Task Report No 1, Site Characterization Plan for Main Base, South and West Flightline Sectors	EPA Region IX	48 CD 2
May 86	Base Letter to EPA Concerning Comments on Phase II, Stage 2, Draft Report for Review and Comment	Chan, Arthur D 93 BMW/CEV	49 CD 2
19 May 86	SOW, Phase II, Stage 2, Draft	HQ SAC/SGPB	50 CD 2
Jun 86	SOW, Phase IVA, RA Plan	Hazardous Materials Technical Center	51 CD 2

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01 Jul 86	Base Letter to MDPH Concerning JP-4 Spill, Bldg 1350	Snow, Verne L 93 CSG/DDE	52 CD 2
30 Jul 86	EPA Comments on SOW, Phase IVA, RA Plan	EPA Region IX	53 CD 2
30 Jul 86	EPA Comments on SOW, Phase II, Stage 2,	EPA Region IX	54 CD 2
30 Jul 86	EPA Letter to Base Concerning Comments on Draft MOU and Agreement for City of Atwater Portable Water Well, 20 Jun 86	Seraydarian, Harry EPA Region IX	911 CD 3
30 Jul 86	MOU, Between the Base and City of Atwater, OT-29	93 CSG/CC City of Atwater EPA Region IX California Department of Health Services Merced County Department of Public Health	1050 CD 4
Aug 86	EPA Letter to Base Concerning Comments on Phase II, Stage 1, Confirmation and Quantification Technical Report and SOW, Phase IVA, RA Plan	Takata, Keith EPA Region IX	55 CD 2
07 Aug 86	MOU, Between USAF, DoD, EPA, CDHS, and MDPH	93 BMW/CC	898 CD 3
21 Aug 86	Boyle Engineering Letter to City of Atwater Concerning Summary of Meeting, Domestic Well and Bellevue Road Water Main Project	Reitz, Mark Boyle Engineering Corp.	56 CD 2
21 Aug 86	EPA Letter to Sharpe Army Depot Concerning Comments on Draft Final Initial Compliance Agreement	Seraydarian, Harry EPA Region IX	900 CD 3

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11 Sep 86	Phase IVA Kickoff Meeting Minutes, 29-30 Jul 86	Kaiser, Donald W, LtCol 93 CSG/DEEV	57 CD 2
16 Sep 86	CRWQCB Letter to Base Concerning Review of Phase II, Stage 2, Investigation Work Plans and Agreement for Expansion of Atwater Water Supply System	Wolfson, James B California Regional Water Quality Control Board	58 CD 2
18 Sep 86	Agreement for Installation of TCE Filtration System at Homeowners Residence	Kirbie, Darrel G, LtCol 93 CSG/DEV	59 CD 2
18 Sep 86	Phase IVA, RA Plan, Draft Task Report Community Relations Plan (CRP), No. 7	Oak Ridge National Laboratory	60 CD 2
30 Sep 86	Base Letter to CDTSC Concerning Closure, PCB Spill Site	Volz, David E, Col 93 CSG/CC	1049 CD 4
Oct 86	Phase II, Stage 2, HSP	Roy F Weston, Inc.	61 CD 2
Oct 86	Phase II, Stage 2, Technical Operations Plan	Roy F Weston, Inc.	62 CD 2
14 Oct 86	Oak Ridge Lab Letter to HQ SAC Concerning Soil Augering at SD-13, DA-5	Loyd, John R Oak Ridge National Laboratory	63 CD 2
15 Oct 86	CDHS Letter to Base Concerning PCB Cleanup Level for Spill Site, PCB Storage Facility, Bldg 1203	Landis, Anthony J California Department of Health Services	64 CD 2
13 Nov 86	MDPH Letter to Base Concerning Petroleum Contaminated Soils at East Perimeter Road	Palsgaard, Jeff H Merced County Department of Public Health	65 CD 2

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13 Nov 86	Base Letter to EPA Concerning Development of IAG Between Base and EPA	Volz, David E, Col 93 CSG/CC	66 CD 2
18 Dec 86	Base Memorandum Concerning Procedures to Obtain Permit for Installing Monitoring Wells in MID Property	Randall, Steven G 93 CSG/DEEV	68 CD 2
23 Dec 86	Base Letter to MID Concerning Request for Permit to Construct and Maintain Pollution Monitoring on MID Rights of Way	Kaiser, Donald W, LtCol 93 CSG/DE	70 CD 2
87	Base Letter to Atwater Signal Concerning Response to Concerns of Resident	Wilson, James F, Col 93 CSG/CC	164 CD 2
Jan 87	Chemical Groundwater Quality Evaluation Report	Boyle Engineering Corp.	86 CD 2
22 Jan 87	Phase IVA Meeting Minutes, 22 Jan 87	93 CSG/DEEV	87 CD 2
28 Jan 87	Oak Ridge Lab Letter to HQ SAC Concerning Submittal of Alternatives for Removal of TCE from Groundwater	Loyd, John R Oak Ridge National Laboratory	88 CD 2
Feb 87	Phase IVA, RA Plan, Task Report No 1 Site Characterization Plan for Main Base, South and West Flightline Sectors	IT Corp.	89 CD 2
26 Feb 87	Base Letter to MID Concerning Monitoring Wells Agreement	Volz, David E, Col 93 CSG/CC	1052 CD 4
11 Mar 87	City of Atwater Letter to Base Concerning Status of Groundwater Investigation	Haug, John A City of Atwater	899 CD 3

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09 Apr 87	CDHS Memorandum Concerning Preliminary Review of Phase IVA, RA Plan, Task Report No 1, Site Characterization for Main Base, South and West Sectors	Buell, Reid California Department of Health Services	71 CD 2
21 Apr 87	CRWQCB Letter to Base Concerning Comments on Current Regulatory Programs and Action	Nevins, Scott California Regional Water Quality Control Board	73 CD 2
24 Apr 87	EPA Letter to Base Concerning Comments on Phase IVA, Site Characterization Plan	Takata, Keith EPA Region IX	74 CD 2
28 Apr 87	EPA Region IX Meeting Minutes, 27 Apr 87	Hawkins, Ronald L, LtCol 93 CSG/DEEV	75 CD 2
30 Apr 87	Base Letter to CRWQCB Concerning SWAT Program Guidance for South Landfill Zone	McGuirk, Dennis P, Col 93 BMW/CV	76 CD 2
May 87	Final Wastewater Characterization and Hazardous Waste Survey Report	USAF OEHL/TSS	1051 CD 4
12 May 87	CRWQCB Letter to Base Concerning SWAT Reports	Nevins, Scott California Regional Water Quality Control Board	81 CD 2
19 May 87	Oak Ridge Lab Letter to EPA Concerning Draft CRP	Loyd, John R Oak Ridge National Laboratory	82 CD 2
19 May 87	Oak Ridge Lab Letter to CDHS Concerning Submittal of Draft CRP	Loyd, John R Oak Ridge National Laboratory	83 CD 2
22 May 87	CDHS Letter to Base Concerning Memos Summarizing Meeting and Conference Calls Addressing Phase IVA, Work Plan	Wang, David California Department of Health Services	84 CD 2

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22 May 87	RA, Technical Status Report and Time Schedule	93 CSG/DEEV	85 CD 2
Jun 87	Phase II, Stage 2, Draft Confirmation and Quantification Technical Report, Vol I of IV	Roy F Weston, Inc.	90 CD 2
Jun 87	Phase II, Stage 2, Draft Confirmation and Quantification Technical Report, Vol III of IV	Roy F Weston, Inc.	91 CD 2
Jun 87	Phase II, Stage 2, Draft Confirmation and Quantification Technical Report, Vol IV of IV, Appendices	Roy F Weston, Inc.	92 CD 2
Jun 87	SOW, SWAT Reports, Four Solid Waste Areas	AFBCA/DD Castle	93 CD 2
13 Jul 87	Base Letter to MID Concerning Request for Permit to Construct and Maintain Groundwater Pollution Monitoring Wells Within MID Lateral Canal Rights of Way	Hodges, Harold W, LtCol 93 BMW/CVE	94 CD 2
22 Jul 87	EPA Letter to Base Concerning Proposal for NPL	Zelikson, Jeffrey EPA Region IX	95 CD 2
Aug 87	Phase IVA, Site Characterization Plan	IT Corp.	96 CD 2
06 Aug 87	Base Letter to EPA Concerning Response to Comments on Phase IVA, Work Plan	Hodges, Harold W, LtCol 93 BMW/CVE	97 CD 2
21 Aug 87	CDHS Letter to EPA Concerning Responses to Comments During Meeting, 15 Jul 87	Buell, Reid California Department of Health Services	98 CD 2

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16 Oct 87	EPA Letter to Base Concerning Comments on Sample Plan of Phase IVA, Revised Site Characterization Plan, Appendix D.	Martyn Goforth, Kathleen A EPA Region IX	102 CD 2
19 Oct 87	SOW, RI/FS and RD	Martin Marietta Energy Systems, Inc.	103 CD 2
02 Nov 87	EPA Letter to Base Concerning Comments on Phase II, Stage 2, Confirmation and Quantification Draft Report	Zimpfer, Amy K EPA Region IX	104 CD 2
05 Nov 87	Base Memorandum Concerning SOV Testing for JP-4 Pipeline Project	Petersen, Alfred 93 BMW/CVE	105 CD 2
05 Nov 87	Newspaper Article, "Haug Clarifies CAFB Well Delay"	UNK	905 CD 3
09 Nov 87	Base Letter to Resident Concerning TCE	Chan, Arthur D 93 BMW/CVE	106 CD 2
09 Nov 87	CDHS Letter to Base Concerning Comments on Phase IVA, Site Characterization Work Plan	Wang, David California Department of Health Services	107 CD 2
13 Nov 87	EPA Letter to Base Concerning Comments on Phase IVA, Site Characterization Plan	Zimpfer, Amy K EPA Region IX	108 CD 2
16 Nov 87	DOI Letter to Base Concerning Comments on Plots of TCE Concentrations Sampled in Test Wells 13-18	Avon, Lizanne US Department of the Interior - Water Resources Division	113 CD 2
23 Nov 87	CDHS Letter to Base Concerning Comments on Phase IVA, Site Characterization Plan, HSP, Appendix B, Aug 87	Wang, David California Department of Health Services	112 CD 2

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08 Dec 87	Base Memorandum Concerning Agenda and Summary of Coordination Meeting with Regulatory Agencies on Phase IVA, Site Characterization Plan, 17 Dec 87	Chan, Arthur D 93 BMW/CVE	111 CD 2
14 Dec 87	CDHS Letter to Base Concerning Toxic RI Conducted Over the Last Five Years	Landis, Anthony J California Department of Health Services	158 CD 2
15 Dec 87	SOW, RI, Proposed JP-4 Fuel Distribution System and Update of Phase IVA, Site Characterization Plan	Martin Marietta Energy Systems, Inc.	110 CD 2
30 Dec 87	Phase IVA Meeting Minutes, 17 Dec 87	Chan, Arthur D 93 BMW/CVE	114 CD 2
Jan 88	SOW, Soil Contaminated with Various Petroleum Hydrocarbons	Horizon Technologies	115 CD 2
08 Jan 88	EPA Letter to Base Concerning Receipt of Phase IVA, Site Characterization Plan	Anderson, Julie EPA Region IX	125 CD 2
19 Jan 88	Base Letter to USAF OEHL/TSS Concerning CDTSC Comments on Phase II, Stage 2, Draft Report, Jun 87	Chan, Arthur D 93 BMW/CVE	130 CD 2
21 Jan 88	CDTSC Letter to Base Concerning Comments on Phase IVA, Work Plan and TCE Plume Characterization	Wang, David California Department of Toxic Substances Control	124 CD 2
27 Jan 88	Base Letter to CDTSC Concerning Poor Progress of RI	Amerasinghe, S Felix 93 CSG/CVE	123 CD 2
03 Feb 88	EPA Letter to Base Concerning Phase IVA, Work Plan	Anderson, Julie EPA Region IX	122 CD 2

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04 Feb 88	CDHS Letter to Atwater City Administrator Concerning Proposed Placement of Production Well Near Bellevue Elementary	Wang, David California Department of Health Services	910 CD 3
08 Feb 88	IRP Meeting Minutes, 08 Feb 88	Chan, Arthur D 93 BMW/CVE	119 CD 2
24 Feb 88	EPA Letter to Base Concerning Kickoff Meeting for Upcoming IAG Negotiations, 02 Mar 88	Anderson, Julie EPA Region IX	121 CD 2
26 Feb 88	Draft FFA	EPA Region IX	118 CD 2
26 Feb 88	Base Letter to CRWQCB Concerning Review of Requirements of Toxic Pits Cleanup Act, 84	Chan, Arthur D 93 BMW/CVE	120 CD 2
01 Mar 88	Draft Interagency FFA	EPA Region IX	117 CD 2
07 Mar 88	EPA Letter to City of Atwater Concerning Oversight of Superfund RI Activities	Anderson, Julie EPA Region IX	904 CD 3
28 Mar 88	Base Letter to EPA Concerning Priority of Phase IVA Work Plan and RI/FS Work Plan	Chan, Arthur D 93 BMW/CVE	116 CD 2
Apr 88	RI/FS, Work Plan, Vol I of IV	IT Corp.	126 CD 2
Apr 88	RI/FS, SAP, Vol II of IV	IT Corp.	127 CD 2
Apr 88	RI/FS, HSP, Vol IV of IV	IT Corp.	129 CD 2

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13 Apr 88	IAG Meeting Minutes, 16-17 Mar 88	Chan, Arthur D 93 BMW/CVE	134 CD 2
May 88	JP-4 Fuel Line Assessment Report	IT Corp.	133 CD 2
May 88	Groundwater Investigation Report, Northeast Quadrant, Vol I of II	Boyle Engineering Corp.	135 CD 2
May 88	Groundwater Investigation Report, Northeast Quadrant, Vol II of II, Appendices	Boyle Engineering Corp.	136 CD 2
26 May 88	EPA Letter to Base Concerning Comments on RI/FS, Revised Basewide Work Plan, Apr 88	Seid, Raymond EPA Region IX	138 CD 2
27 May 88	CDHS Letter to Base Concerning Comments on RI/FS, Basewide Work Plan, Apr 88	Wang, David California Department of Health Services	139 CD 2
Jun 88	Draft Preliminary Design Report for Production Well and Water Main	Boyle Engineering Corp.	140 CD 2
22 Jun 88	SOW, Type A Services for Environmental SWAT and TPCA Investigations	93 BMW/LGC	141 CD 2
23 Jun 88	Well Installation Procedures, Test Wells 12-18	93 CSG/CVE	142 CD 2
29 Jun 88	IAG Meeting Minutes, 14 and 15 Apr 88	Chan, Arthur D 93 BMW/CVE	143 CD 2
Jul 88	Phase II, Stage 2, Final Confirmation/Quantification Report, Vol I of III	Roy F Weston, Inc.	144 CD 2

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Jul 88	Phase II, Stage 2, Final Confirmation/Quantification Report, Vol II of III	Roy F Weston, Inc.	145 CD 2
Jul 88	Phase II, Stage 2, Final Confirmation/Quantification Report, Vol III of III	Roy F. Weston, Inc.	146 CD 2
01 Jul 88	IT Corp Letter to Base Concerning Responses to EPA and CDHS Comments on RI/FS, Work Plans	IT Corp.	147 CD 2
01 Jul 88	Base Response to EPA Comments on Phase II, Stage 2, Report	93 CSG/DEEV	148 CD 2
01 Jul 88	Base Response to CDHS Comments on Phase II, Stage 2, Report	93 CSG/DEEV	149 CD 2
06 Jul 88	IT Corp Letter to Base Concerning Response to EPA and CDHS Comments on RI/FS, Work Plans, Apr 88	IT Corp.	150 CD 2
14 Jul 88	EPA Letter to Base Concerning Comments on Documentation Requirements for Data Validation of Non-CLP Laboratory Data	Seid, Raymond EPA Region IX	151 CD 2
15 Jul 88	CDHS Letter to Base Concerning Implementation of Toxic Waste Site Characterization Phase of RI/FS, Apr 88	Wang, David California Department of Health Services	152 CD 2
15 Jul 88	USAF OEHL Letter to HQ SAC/DEV Concerning Responses to EPA, CDHS, and Martin Marietta Comments on Phase II, Stage 2, Report	Williams, Joanne B USAF OEHL/TSS	153 CD 2

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18 Jul 88	RI/FS Work Plan Meeting Minutes, 03 Jun 88	Amerasinghe, S Felix 93 BMW/CVE	154 CD 2
19 Aug 88	CDHS Letter to Base Concerning RI/FS Work Plans Meeting Transcript, 03 Jun 88 and Conference Calls, 14, 27 Jun 88	Wang, David California Department of Health Services	155 CD 2
29 Aug 88	IT Corp. Letter to Martin Marietta Concerning Comments on Final Clarifications of Regulatory Comments on Work Plan, Sampling Plan, HSP, and QAPP, Jun 88	Erikson, Dike G IT Corp.	156 CD 2
30 Aug 88	Base Letter to CRWQCB Concerning Two Off Base Landfill Areas Within Property Line of Castle Vista	Chan, Arthur D 93 BMW/CVE	157 CD 2
Sep 88	RI/FS, QAPP, Vol III of IV	IT Corp.	128 CD 2
01 Sep 88	EPA Letter to Base Concerning Failure to Receive Addendum to Work Plan, Addressing Comments on Revised Work Plan	Anderson, Julie EPA Region IX	159 CD 2
08 Sep 88	CRWQCB Letter to Base Concerning Summary of Status of Regulatory Programs and Actions	Del Sarto, Glenn California Regional Water Quality Control Board	160 CD 2
09 Sep 88	CRWQCB Letter to Base Concerning Landfills Found in Castle Vista Housing Area	Mosbacher, Michael H California Regional Water Quality Control Board	161 CD 2
14 Sep 88	RPM Meeting Minutes, 13 Sep 88	Chan, Arthur D 93 BMW/CVE	162 CD 2

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14 Sep 88	Newspaper Article, "TCE Evaluation Programs Under Way at CAFB"	The Atwater Signal	165 CD 2
15 Sep 88	Newspaper Article, "Please Output for Bill K, TCE Letter"	Resident The Atwater Signal	163 CD 2
Oct 88	RI/FS, Draft Final Community Relations Plan (CRP)	IT Corp.	166 CD 2
Oct 88	EPA Letter to Base Concerning Location of City of Atwater Proposed Production Well	Anderson, Julie EPA Region IX	903 CD 3
04 Oct 88	FFA With EPA Under CERCLA Section 120	93 CSG/DEEV	167 CD 2
05 Oct 88	IAG Meeting Minutes, 27-29 Sep 88	Chan, Arthur D 93 BMW/CVE	168 CD 2
10 Oct 88	EPA Memorandum Concerning Review of Groundwater Documents	Joma, Hannibal EPA Region IX	909 CD 3
19 Oct 88	Geo/Resource Consultants Letter to EPA Concerning Review of Responses to EPA and CDHS Comments on Work Plan	Tryhorn, Alan D Vanek, Eva Geo/Resource Consultants, Inc.	169 CD 2
27 Oct 88	Preliminary Health Assessment Study	EPA Region IX	204 CD 2
28 Oct 88	EPA Letter to City of Atwater Concerning Location of Proposed Production Well	Anderson, Julie EPA Region IX	908 CD 3
31 Oct 88	EPA Letter to Base Concerning Approval of QAPP for Work Plan	Flaherty, Michael S EPA Region IX	171 CD 2

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Nov 88	Fact Sheet, Castle Environmental Update, Vol I, No. 1	93 BMW/PA	173 CD 2
22 Nov 88	EPA Letter to Base Concerning Measures Taken to Mitigate Exposure to TCE Contaminated Water, Mobile Home Park	Flaherty, Michael S EPA Region IX	902 CD 3
23 Nov 88	RPM Meeting Minutes, 27 Oct 88	Chan, Arthur D 93 BMW/CVE	175 CD 2
Dec 88	RI/FS, Work Plans, Addendum	IT Corp.	176 CD 2
02 Dec 88	MDPH Letter to EPA Concerning Federal Drinking Water Regulations	Palsgaard, Jeff H Merced County Department of Public Health	901 CD 3
05 Dec 88	USAF OEHL Letter to Base Concerning Responses to EPA and CDHS Comments on Phase II, Stage 2, Report	Styles, Jerald E, Lt USAF OEHL/TSS	177 CD 2
08 Dec 88	EPA Letter to Base Concerning Comments on Phase II, Stage 2 Confirmation and Quantification Final Report	Flaherty, Michael S EPA Region IX	178 CD 2
21 Dec 88	Grain Size Analysis Data	IT Corp.	179 CD 2
26 Jan 89	Base Letter to Kleinfelder Concerning SOW for Environmental SWAT and TPCA Investigations	Houston, Walter M 93 CSG/LGCC	182 CD 2
26 Jan 89	Newspaper Article, "Mobile Home Park Taps City Water"	De La Cruz, Mike The Merced Sun Star	334 CD 2

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08 Feb 89	Newspaper Article, "H2O Spells Happiness for Park Residents"	De La Cruz, Mike The Atwater Signal	172 CD 2
16 Feb 89	Base Letter to CRWQCB Concerning Status of SWAT/TPCA Investigation	Chan, Arthur D 93 BMW/CVE	186 CD 2
25 Feb 89	Press Release, New Standards for 11 Chemical Contaminants of Drinking Water, Effective 25 Feb 89	California Regional Water Quality Control Board	188 CD 2
28 Feb 89	TCE Sampling Analysis Data	California Water Labs	187 CD 2
Mar 89	Fact Sheet, Castle Environmental Update, Vol II, No. 1	93 BMW/PA	189 CD 2
Mar 89	Draft Groundwater Treatment Feasibility Report for Organics Removal, Main Base Wells 1, 2, and 3	Boyle Engineering Corp.	190 CD 2
08 Mar 89	TPCA Investigation Work Plan for Fire Training Areas	Kleinfelder, Inc.	191 CD 2
08 Mar 89	Solid Waste Assessment Test Proposals Report	Kleinfelder, Inc.	192 CD 2
15 Mar 89	CDHS Letter to Base Concerning Comments on Meeting to Discuss Communication and IRM Concerns, 07 Feb 89	Wang, David California Department of Health Services	193 CD 2
05 Apr 89	EPA Letter to HQ USAF Concerning Comments on Meeting at Norton AFB, 28 Mar 89	Zelikson, Jeffrey EPA Region IX	195 CD 2

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10 Apr 89	CRWQCB Letter to Base Concerning TPCA Investigative Work Plan	Del Sarto, Glenn California Regional Water Quality Control Board	196 CD 2
27 Apr 89	EPA Letter to Base Concerning Comments on SWAT Proposal, TPCA Investigation Work Plan, and Fire Training Areas	Flaherty, Michael S EPA Region IX	198 CD 2
27 Apr 89	CDHS Letter to Base Concerning Comments on CRP	O'Kane, John A, Jr California Regional Water Quality Control Board	199 CD 2
28 Apr 89	CRWQCB Letter to Base Concerning Comments on SWAT Proposal Review Comments	Mosbacher, Michael H California Regional Water Quality Control Board	200 CD 2
May 89	FFA, Under CERCLA Section 120	HQ USAF California Department of Toxic Substances Control California Regional Water Quality Control Board EPA Region IX	78 CD 2
May 89	Groundwater Treatment Feasibility Report for Organics Removal, Main Base Wells 1, 2, and 3	Boyle Engineering Corp.	201 CD 2
04 May 89	EPA Letter to DOA Concerning Confirmation of IAG Negotiations, 08 May 89-12 May 89	Zelikson, Jeffrey EPA Region IX	202 CD 2
10 May 89	Martin Marietta Letter to CDHS Concerning RI/FS, Work Plan Addendum	Loyd, John R Martin Marietta Energy Systems, Inc.	203 CD 2

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11 May 89	IAG, FFA Under CERCLA Section 120	HQ SAC California Department of Toxic Substances Control California Regional Water Quality Control Board EPA Region IX	208 CD 2
Jun 89	Geological and Water Quality Test Results for Production Well 12	Boyle Engineering Corp.	205 CD 2
13 Jun 89	Base Memorandum Concerning CRWQCB Comments on SWAT, TPCA Work Plans	Chan, Arthur D 93 BMW/CVE	207 CD 2
15 Jun 89	HQ USEPA Letter to EPA Region IX Concerning Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites	Longest, Henry L, II Emison, Gerald HQ USEPA	1763 CD 9
29 Jun 89	Newspaper Article, "Family Sues AF Over Tainted Well"	McCarthy, Charles The Fresno Bee	209 CD 2
Jul 89	EA, Disposal and Reuse, Location and Construction of New Production Well 12	Boyle Engineering Corp.	210 CD 2
Jul 89	FFA Under CERCLA Section 120	HQ USAF EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	1007 CD 4
10 Jul 89	Press Release, FFA to be Signed	93 BMW/PA	211 CD 2
20 Jul 89	EPA Letter to Base Concerning Comments on Changes to Groundwater Sampling Events and Soil Boring Locations	Flaherty, Michael S EPA Region IX	213 CD 2

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21 Jul 89	Federal Facility Agreement	93 WG/PA	1245 CD 6
31 Jul 89	CDHS Letter to Base Concerning Review of Modification to Groundwater Sampling Events and Soil Boring Locations	O'Kane, John A, Jr California Department of Health Services	215 CD 2
08 Aug 89	Base Memorandum Concerning Retired SMSgt Visit to Waste Dump Site, DP-28	Tekrony, Linda 93 BMW/CVE	216 CD 2
10 Aug 89	EPA Letter to Base Concerning Ongoing RI Activities	Flaherty, Michael S EPA Region IX	217 CD 2
15 Sep 89	Geo/Resource Letter to EPA Concerning Review of Recent Water Level Data for Monitoring Wells	Vanek, Eva Tryhorn, Alan D Geo/Resource Consultants, Inc.	221 CD 2
19 Sep 89	EPA Letter to Base Concerning Comments on RPM Meeting, 10 Aug 89	Flaherty, Michael S EPA Region IX	222 CD 2
20 Sep 89	CRWQCB Letter to Base Concerning Review of GAC Filtration Pump Test Results	Mosbacher, Michael H California Regional Water Quality Control Board	223 CD 2
16 Oct 89	RPM Meeting Minutes, 20 Sep 89	Chan, Arthur D 93 BMW/CVE	225 CD 2
23 Oct 89	72-Hour Leaking Aquifer Pump Test Letter Report	Boyle Engineering Corp.	228 CD 2
25 Oct 89	Base Memorandum Concerning TRC Meeting to be Held 30 Nov 89	Chan, Arthur D 93 BMW/CVE	226 CD 2

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25 Oct 89	Base Memorandum Concerning Correspondence to CRWQCB for SWAT Portion of Contract	Houston, Walter M 93 CSG/LGCC	227 CD 2
09 Nov 89	Base Letter to Oak Ridge Lab Concerning CRWQCB Comments on Castle Vista Landfill Investigations	Chan, Arthur D 93 BMW/CVE	174 CD 2
21 Nov 89	Third Quarter Sampling Results from Production Wells 5, 6, 9, 10, and 11 for Review	93 MG/SGPB	230 CD 2
28 Nov 89	TRC Charter	Famulare, Eugene J, Col 93 BMW/CV	231 CD 2
28 Nov 89	SOW, RI/FS, Step 3 Tasks	Martin Marietta Energy Systems, Inc.	369 CD 3
01 Dec 89	Base Letter to Resident Concerning Drinking Water Samples	Oyelowo, Layi A 93 CSG/EM	232 CD 2
07 Dec 89	Kleinfelder Letter to Base Concerning Responses to EPA Comments on SWAT/TPCA Work Plans	Johnson, Christopher S Carey, Russell O Kleinfelder, Inc.	234 CD 2
11 Dec 89	Base Letter to CDHS Concerning Deadline for IAG Primary Documents	Fowler, John F, Col 93 CSG/CC	235 CD 2
13 Dec 89	Kleinfelder Letter to Base Concerning Comments on Results of Water Samples Collected From Boring B-237 in South Landfill Zone	Johnson, Christopher S Kleinfelder, Inc.	236 CD 2
21 Dec 89	TRC Meeting Agenda, 10 Jan 90	Chan, Arthur D 93 CSG/EM	381 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
22 Dec 89	Base Letter to EPA and CDHS Concerning RPM Meeting Minutes, Nov 89	Chan, Arthur D 93 CSG/EM	239 CD 2
22 Dec 89	EPA Letter to Base Concerning Comments on IAG Proposed Deadlines Pursuant to Section 8	Flaherty, Michael S EPA Region IX	240 CD 2
Jan 90	SOW, Close Water Wells 2, 3, 4	93 CSG/EM	1020 CD 4
02 Jan 90	Base Letter to HQ SAC Concerning First TRC Meeting, 10 Jan 90	Chan, Arthur D 93 CSG/EM	241 CD 2
03 Jan 90	Certificate of Analysis, CAC Title 22 Drinking Water Compliance	California Water Labs	242 CD 2
04 Jan 90	EPA Letter to Base Concerning Non-Concurrence With Proposed Deadlines for Primary Documents	Flaherty, Michael S EPA Region IX	243 CD 2
05 Jan 90	Base Letter to CDHS Concerning Comments on IAG Schedule	Oyelowo, Layi A 93 CSG/EM	244 CD 2
08 Jan 90	CDHS Letter to Base Concerning Response to Draft TRC Charter	O'Kane, John A, Jr California Department of Health Services	245 CD 2
10 Jan 90	Base Letter to Martin Marietta Concerning Comments on Regulatory Review of IAG Schedule	Chan, Arthur D 93 CSG/EM	246 CD 2
18 Jan 90	Base Letter to EPA and CDHS Concerning Comments on RPM Meeting on Groundwater Workshop	Chan, Arthur D 93 CSG/EM	247 CD 2

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
19 Jan 90	TRC Meeting Minutes, 19 Jan 90	93 BMW/PA	248 CD 2
31 Jan 90	EPA Letter to Base Concerning Comments on Draft TRC Charter	Flaherty, Michael S EPA Region IX	250 CD 2
09 Feb 90	RI/FS Project Status Meeting Minutes, 25 Jan 90	Martin Marietta Energy Systems, Inc.	251 CD 2
12 Feb 90	Base Memorandum Concerning Regulatory Comments on Proposed TRC Charter	Oyelowo, Layi A 93 CSG/EM	252 CD 2
13 Feb 90	RPM Meeting Minutes, 25 Jan 90	Chan, Arthur D 93 CSG/EM	253 CD 2
13 Feb 90	Base Letter to EPA and CDHS Concerning Final IAG Schedule	Chan, Arthur D 93 CSG/EM	254 CD 2
28 Feb 90	RPM Meeting Agenda and Location, 07 Mar 90	Chan, Arthur D 93 CSG/EM	255 CD 2
07 Mar 90	EPA Letter to Base Concerning Review of Response to Comments on SWAT Work Plan	Flaherty, Michael S EPA Region IX	256 CD 2
07 Mar 90	RI/FS Project Meeting Minutes, 07 Mar 90	Martin Marietta Energy Systems, Inc	257 CD 2
21 Mar 90	CRWQCB Letter to Base Concerning Rational for MW 713 and 714 Placements	Mosbacher, Michael H California Regional Water Quality Control Board	259 CD 2
23 Mar 90	CDHS Letter to Base Concerning Rational for Locating MW 713 and 714 to Determine Potential TCE Source Areas	O'Kane, John A, Jr California Department of Health Services	260 CD 2

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27 Mar 90	Base Letter to EPA and CDHS Concerning Comments on Revised IAG Schedule Presented at RPM Meeting, 07 Mar 90	Chan, Arthur D 93 CSG/EM	274 CD 2
28 Mar 90	Kleinfelder Letter to Base Concerning Comments on Final Response to EPA Comments on SWAT Proposal	Johnson, Christopher S Carey, Russell O Kleinfelder, Inc.	261 CD 2
06 Apr 90	CDHS Letter to Base Concerning Review of IAG Final Schedule of Primary Document Deliverables	Landis, Anthony J California Department of Health Services	263 CD 2
06 Apr 90	EPA Letter to Base Concerning Confirmation of Agreement with Rational Provided by Air Force for Locating MW 713 and 714	Flaherty, Michael S EPA Region IX	264 CD 2
09 Apr 90	Base Letter to EPA and CDHS Concerning RI/FS Project Meeting Minutes, 07 Mar 90	Ridenour, Charles B 93 CSG/EM	265 CD 2
09 Apr 90	Applicability of Toxic Pits Cleanup Act to FTA-3 Report	Kleinfelder, Inc.	266 CD 2
09 Apr 90	Base Letter to Various Agencies Concerning Closure of MOU	Fowler, John F, Col 93 CSG/CC	1055 CD 4
10 Apr 90	EPA Letter to Base Concerning Delineated Wells Sampled in Rounds 3 and 4 of Groundwater Monitoring Program	Flaherty, Michael S EPA Region IX	267 CD 2
12 Apr 90	Base Memorandum Concerning Kleinfelder Final Response to EPA on SWAT/TPCA Program, 07 Mar 90	Ridenour, Charles B 93 CSG/EM	268 CD 2
17 Apr 90	Technical Memorandum Report, Pilot Treatment Plant	93 CSG/EM	269 CD 2

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17 Apr 90	TRC Meeting Agenda, 25 Apr 90	Steuck, Jay C, Lt 93 BMW/PA	270 CD 2
25 Apr 90	TRC Meeting Minutes, 25 Apr 90	93 CSG/EM	273 CD 2
May 90	SWAT Work Plan, Castle Vista Landfills	IT Corp.	275 CD 2
02 May 90	RI/FS Project Meeting Minutes, 24 Apr 90	Loyd, John R Martin Marietta Energy Systems, Inc.	272 CD 2
08 May 90	SWAT Report	Kleinfelder, Inc.	276 CD 2
18 May 90	MID Letter to Base Concerning Casad Canal Right of Way to Test for Monitoring Wells	Reta, Tom Merced Irrigation District	277 CD 2
23 May 90	RPM Meeting Agenda, 31 May 90	Chan, Arthur D 93 CSG/EM	278 CD 2
25 May 90	EPA Letter to Base Concerning SWAT and TPCA Programs	Flaherty, Michael S EPA Region IX	280 CD 2
25 May 90	SWAT Report West Landfill Zone, Vol I of II	Kleinfelder, Inc.	281 CD 2
25 May 90	SWAT Report, West Landfill Zone, Vol II of II	Kleinfelder, Inc.	282 CD 2
30 May 90	CDHS Letter to Base Concerning Comments on Technical Memorandum for Proposed Long Term Pumping Test	O'Kane, John A, Jr California Department of Health Services	283 CD 2

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
31 May 90	Base Memorandum Concerning RPM Meeting Minutes, 31 May 90	Chan, Arthur D 93 CSG/EM	284 CD 2
31 May 90	DSMOA	Kizer, Kenneth W California Department of Health Services	359 CD 3
Jun 90	SOW, TCE Filtration System for Residents	93 CSG/DEVR	72 CD 2
Jun 90	Draft Community Relations Plan (CRP)	93 BMW/PA	285 CD 2
Jun 90	Fact Sheet, Environmental Update, Vol II, No 2	93 BMW/PA	286 CD 2
Jun 90	Base Letter to Residents Concerning Monthly TCE Samples Taken from Drinking Water	Sassaman, Brian L, Lt 93 MG/SGPB	287 CD 2
Jun 90	Base Letter to Residents Concerning Monthly TCE Samples Taken to Monitor Drinking Water Quality, OT-30	Sassaman, Brian L, Lt 93 MG/SGPB	288 CD 2
Jun 90	Base Letter to Resident Concerning Installation of GAC Filter to Remove TCE, OT-30	Sassaman, Brian L, Lt 93 MG/SGPB	289 CD 2
Jun 90	Base Letter to Resident Concerning Installation of GAC Filter at Residence to Remove TCE	Sassaman, Brian L, Lt 93 MG/SGPB	290 CD 2
Jun 90	Base Letter to Resident Concerning Monthly TCE Samples Taken at Residence to Monitor Drinking Water Quality	Sassaman, Brian L, Lt 93 MG/SGPB	292 CD 2

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Jun 90	Base Letter to Resident Concerning Monthly TCE Samples Taken at Residence to Monitor Drinking Water Quality	Sassaman, Brian L, Lt 93 MG/SGPB	293 CD 2
Jun 90	Base Letter to Resident Concerning Installation of GAC Filter to Remove TCE, OT-30	Sassaman, Brian L, Lt 93 MG/SGPB	294 CD 2
Jun 90	Base Letter to Resident Concerning Water Sample Collected from Well by Bioenvironmental Engineering	Sassaman, Brian L, Lt 93 MG/SGPB	295 CD 2
Jun 90	Base Letter to Residents Concerning Water Sample Collected From Well by BioEnvironmental Engineering	Sassaman, Brian L, Lt 93 MG/SGPB	299 CD 2
01 Jun 90	SWAT Report, South Landfill Zone, Vol I of II	Kleinfelder, Inc.	296 CD 2
01 Jun 90	SWAT Report, South Landfill Zone, Vol II of II	Kleinfelder, Inc.	297 CD 2
05 Jun 90	TRC Charter	93 CSG/EM	300 CD 2
11 Jun 90	RPM Meeting Agenda, 22 Jun 90	Chan, Arthur D 93 CSG/EM	301 CD 2
11 Jun 90	CDTSC Response to Public Comments Concerning Intent to Deny Permit to Operate Hazardous Waste Facility	California Department of Toxic Substances Control	339 CD 2
12 Jun 90	CDHS Letter to Base Concerning Review of SWAT Work Plan, Castle Vista Landfills	O'Kane, John A, Jr California Department of Health Services	302 CD 2

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18 Jun 90	Base Letter to EPA and CDHS Concerning Addition of Topics to Agenda for Discussion	Chan, Arthur D 93 CSG/EM	304 CD 2
20 Jun 90	CRWQCB Letter to Base Concerning Completion of Review of SWAT Work Plan, Castle Vista Landfill	Mosbacher, Michael H California Regional Water Quality Control Board	305 CD 2
26 Jun 90	CRWQCB Letter to Base Concerning Completion of Review of TPCA, FTA-3	Pinkos, Thomas R California Regional Water Quality Control Board	306 CD 2
28 Jun 90	CRWQCB Letter to Base Concerning Disposal of Drill Cuttings From RI/FS Activities	Mosbacher, Michael H California Regional Water Quality Control Board	307 CD 2
29 Jun 90	Base Letter to EPA and CDHS Concerning Transmittal of Draft Work Plan II	Chan, Arthur D 93 CSG/EM	308 CD 2
29 Jun 90	Base Letter to City of Atwater Concerning Castle Vista Military Housing Area Landfills	Chan, Arthur D 93 CSG/EM	309 CD 2
Jul 90	TRC Meeting Minutes, 14 Jun 90	93 BMW/PA	303 CD 2
03 Jul 90	EPA Letter to Base Concerning Applicability of RI/FS Requirements, Castle Vista Landfills	Work, Michael EPA Region IX	310 CD 2
17 Jul 90	RPM Meeting Minutes, 22 Jun 90	Chan, Arthur D 93 CSG/EM	312 CD 2
20 Jul 90	CRWQCB Letter to CDHS Concerning Comments on Preliminary Site Characterization Report	Mosbacher, Michael H California Regional Water Quality Control Board	313 CD 2

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30 Jul 90	Base Letter to Resident Concerning Merced Union High School Site	Oyelowo, Layi A 93 CSG/EM	314 CD 2
31 Jul 90	EPA Letter to Base Concerning Comments on Draft Preliminary Site Characterization Report	Work, Michael EPA Region IX	315 CD 2
31 Jul 90	CRWQCB Letter to Base Concerning Completion, Review of South Landfill SWAT Report	Mosbacher, Michael H California Regional Water Quality Control Board	316 CD 2
Aug 90	FS, Draft Report, OU-1	IT Corp.	317 CD 2
01 Aug 90	Base Letter to EPA and CDHS Concerning Transmittal of FS, Draft Report, OU-1	Ridenour, Charles B 93 CSG/EM	318 CD 2
01 Aug 90	Base Letter to Martin Marietta Concerning Comments on List of Standards for ARARs	Ridenour, Charles B 93 CSG/EM	319 CD 2
06 Aug 90	RPM Meeting Minutes, 24 Jul 90	Chan, Arthur D 93 CSG/EM	320 CD 2
06 Aug 90	CRWQCB Letter to Base Concerning Disposal of Drill Cuttings From RI/FS Activities	Mosbacher, Michael H California Regional Water Quality Control Board	322 CD 2
08 Aug 90	EPA Letter to Base Concerning Need for RA, TCE	Work, Michael EPA Region IX	321 CD 2
10 Aug 90	CDHS Letter to HQ SAC Concerning IAG	Larson, Walter J California Department of Health Services	323 CD 2

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10 Aug 90	Newspaper Article, "Base Eyes Possible Past Refuse Sites"	The Valley Bomber	324 CD 2
13 Aug 90	RPM Meeting Agenda, 16 Aug 90	Chan, Arthur D 93 CSG/EM	325 CD 2
22 Aug 90	SOW, Step III Tasks, Revision II	Martin Marietta Energy Systems, Inc.	326 CD 2
25 Aug 90	Response to EPA Comments on OU FS Draft	UNK	327 CD 2
29 Aug 90	Newspaper Article, "Public Notice, Castle AFB CRP, Public Comment Period"	The Merced Sun Star	328 CD 2
31 Aug 90	EPA Letter to Base Concerning Comments on RI/FS, Draft Work Plan No 2	Work, Michael EPA Region IX	329 CD 2
Sep 90	RI/FS, Preliminary Site Characterization Report, Vol I of III	IT Corp.	330 CD 2
Sep 90	RI/FS, Preliminary Site Characterization Report, Vol II of III	IT Corp.	331 CD 2
Sep 90	RI/FS, Preliminary Site Characterization Report, Vol III of III	IT Corp.	332 CD 2
Sep 90	SOW, Maintenance and Servicing of Three Existing Culligan Activated Carbon Water Filtration Systems	93 CSG/DEEV	907 CD 3
14 Sep 90	Rational for Long Term Well Sampling Program	93 CSG/EM	335 CD 2

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
20 Sep 90	RPM Meeting Agenda, 26-27 Sep 90	Baker, Thomas R, LtCol 93 CSG/EM	336 CD 2
27 Sep 90	RI/FS Project Meeting Minutes, 26-27 Sep 90	93 CSG/EM	337 CD 2
28 Sep 90	RPM Meeting Minutes, 16 Aug 90	Chan, Arthur D 93 CSG/EM	338 CD 2
Oct 90	Fact Sheet, Base Environmental Update, Oct 90	93 BMW/PA	340 CD 2
Oct 90	Ambient Air Monitoring Report	California Department of Health Services	1003 CD 4
09 Oct 90	IT Corp. Letter to Martin Marietta Concerning Response to EPA Comments on UV/Peroxidation, RI/FS	Grummitt, Terry P IT Corp.	343 CD 2
10 Oct 90	EPA Letter to Base Concerning Upcoming Deadlines for FS, Report No 1, Proposed Plan and ROD, OU-1	Work, Michael EPA Region IX	344 CD 2
12 Oct 90	Base Letter to EPA and CDHS Concerning Draft Final Work Plan II	Chan, Arthur D 93 CSG/EM	345 CD 2
15 Oct 90	Base Letter to CRWQCB Concerning Response to Comments on Draft Report, South Landfill Zone	Chan, Arthur D 93 CSG/EM	347 CD 2
16 Oct 90	RPM Meeting Minutes, 26-27 Sep 90	Chan, Arthur D 93 CSG/EM	348 CD 2
19 Oct 90	Base Letter to EPA Concerning List of OUs According to Definition in NCP	Kehoe, Michael J, Col 93 BMW/CV	349 CD 2

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24 Oct 90	RPM Meeting Agenda, 30 Oct 90	Chan, Arthur D 93 CSG/EM	350 CD 2
24 Oct 90	EPA Letter to Base Concerning Failure to Submit Draft Final Work Plan No 2	Work, Michael EPA Region IX	351 CD 2
31 Oct 90	Base Letter to EPA and CDHS Concerning RI/FS, Draft Final Report, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	352 CD 2
31 Oct 90	TRC Meeting Agenda	Leong, Linda L, Maj 93 BMW/PA	353 CD 2
Nov 90	SWAT Draft Report, Castle Vista Landfills	IT Corp.	354 CD 3
Nov 90	Work Plan No 2	IT Corp.	355 CD 3
02 Nov 90	CDHS Letter to Base Concerning Comments on LTM Sampling Plan, Sep 90	O'Kane, John A, Jr California Department of Health Services	356 CD 3
02 Nov 90	EPA Letter to Base Concerning Comments on RI/FS Long Term Sampling Program	Work, Michael EPA Region IX	357 CD 3
08 Nov 90	EPA Letter to Base Concerning Comments on FS, Interim, Draft Final Report, OU-1	Work, Michael EPA Region IX	358 CD 3
13 Nov 90	Base Letter to EPA and CDHS Concerning Response to Comments on RI/FS, Draft Work Plan No 2	Alford, Benjamin F, Col 93 CSG/CC	360 CD 3
15 Nov 90	Soil Remediation Report	Horizon Technologies	361 CD 3

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16 Nov 90	Base Letter to EPA Concerning Comments on FS, Final Report, OU-1	Chan, Arthur D 93 CSG/EM	362 CD 3
16 Nov 90	Update Pages, FS, Final Report, OU-1	IT Corp.	363 CD 3
26 Nov 90	EPA Letter to Base Concerning Comments on Proposed Revisions to Proposed Plan	Work, Michael EPA Region IX	364 CD 3
27 Nov 90	EPA Letter to Base Concerning Delivery of FS, Final Report, OU-1	Work, Michael EPA Region IX	365 CD 3
27 Nov 90	EPA Letter to Base Concerning Additional Comments on FS and Proposed Plan, OU-1	Work, Michael EPA Region IX	366 CD 3
27 Nov 90	Base Letter to Martin Marietta Concerning Proposed Plan Revisions to FS, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	367 CD 3
27 Nov 90	EPA Letter to Base Concerning Review and Comments on Changes to FS and Proposed Plan, Draft Final Review Period, 30 Nov 90, OU-1	Work, Michael EPA Region IX	368 CD 3
30 Nov 90	EPA Letter to Base Concerning Additional Comments on FS and Proposed Plan, OU-1	Work, Michael EPA Region IX	370 CD 3
Dec 90	Proposed Plan, Containment and Remediation of Main Groundwater Contaminant Plume	93 BMW/PA	371 CD 3
Dec 90	ROD, UFL-3, SS-17	IT Corp.	372 CD 3
Dec 90	RFA, Report	California Department of Health Services	373 CD 2

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Dec 90	Draft Preliminary Health Risk Evaluation Report	IT Corp.	374 CD 2
Dec 90	FS, Interim Report, OU-1	IT Corp.	375 CD 3
03 Dec 90	EPA Letter to Base Concerning Request for Extension on Finalization of FS, Report and Proposed Plan, OU-1	Kemmerer, John R EPA Region IX	376 CD 3
05 Dec 90	TRC Meeting Minutes, 31 Oct 90	Vician, Todd M B, Lt 93 BMW/PA	377 CD 3
07 Dec 90	Base Letter to EPA Concerning Comments on Update Pages, FS Report, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	378 CD 3
11 Dec 90	RPM Meeting Agenda, 18 Dec 90	Oyelowo, Layi A 93 CSG/DEV	379 CD 3
18 Dec 90	RI/FS Project Meeting Minutes, 18 Dec 90	93 CSG/DEV	383 CD 3
27 Dec 90	Residents Vs. USAF Court Document, First Set of Interrogatories and Request for Production of Documentation	US District Court of California	983 CD 4
91	Storage Tank Statistics and Information Report on Contaminants Detected During 91 Tank Pull	Camp Dresser & McKee, Inc.	513 CD 3
Jan 91	Technical Memorandum Report, Long Term Pumping Test	IT Corp.	382 CD 3
04 Jan 91	Newspaper Article, "Water Cleanup Public Meeting Set for Tuesday"	The Merced Sun Star	384 CD 3

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08 Jan 91	Public Meeting Minutes on Ground Cleanup Presentation, OU-1	Vician, Todd M B, Lt 93 BMW/PA	385 CD 3
08 Jan 91	Newspaper Article, "Cleanup Plan is Aired"	The Modesto Bee	386 CD 3
08 Jan 91	RPM Meeting Minutes, 18 Dec 90	Cole, John R, LtCol 93 CSG/DE	389 CD 3
09 Jan 91	Newspaper Article, "Castle Cleanup Plan Ready for Public Comment"	De La Cruz, Mike The Merced Sun Star	387 CD 3
10 Jan 91	Newspaper Article, "Castle to Clean Up Aquifer"	The Atwater New Times The Merced County Times The Winton Times	388 CD 3
10 Jan 91	Base Letter to EPA and CDHS Concerning Response to Comments on Long Term Pump Test Program	Chan, Arthur D 93 CSG/DEV	390 CD 3
15 Jan 91	Base Letter to EPA Concerning Comments on IAG Schedule Extension Request	Alford, Benjamin F, Col 93 CSG/DEV	391 CD 3
16 Jan 91	EPA Letter to Base Concerning Comments on Groundwater Plume Characterization Scoping Memorandum Draft Work Plan, OU-3	Work, Michael EPA Region IX	392 CD 3
16 Jan 91	Newspaper Article, "Base Ready to Begin TCE Cleanup, Public May Still Have Questions"	De La Cruz, Mike The Merced Sun Star	393 CD 3
23 Jan 91	Newspaper Article, "Castle AFB Announces Extension of Public Comment Period on Proposed Cleanup"	The Merced Sun Star	394 CD 3

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24 Jan 91	RI/FS Project Meeting Minutes, 23-24 Jan 91	93 CSG/DEEV	395 CD 3
30 Jan 91	EPA Letter to Base Concerning Timeframe for Responding to Proposed Schedule, OU-2	Work, Michael EPA Region IX	396 CD 3
07 Feb 91	Base Letter to EPA and CDHS Concerning IAG Schedule Extension Request for Delivery of Decision Document, OU-1	Cole, John R, LtCol 93 CSG/DE	397 CD 3
11 Feb 91	RPM Meeting Minutes, 23-24 Jan 91	Chan, Arthur D 93 CSG/DEV	398 CD 3
12 Feb 91	EPA Letter to Base Concerning Schedule Changes to Currently Identified OUs and Anticipated Changes to Overall RI/FS	Kemmerer, John R EPA Region IX	399 CD 3
20 Feb 91	Base Letter to EPA Concerning Comments on RI/FS Schedule	Kehoe, Michael J, Col 93 BMW/CV	401 CD 3
21 Feb 91	EPA Letter to Base Concerning Comments on Draft Preliminary Health Risk Evaluation	Work, Michael EPA Region IX	402 CD 3
22 Feb 91	EPA Letter to Base Concerning Comments on Draft LTM Sampling Plan	Work, Michael EPA Region IX	403 CD 3
22 Feb 91	CDHS Letter to Base Concerning Comments on LTM Draft Sampling Plan	Wang, David California Department of Health Services	404 CD 3
25 Feb 91	Base Memorandum Concerning RPM RI/FS Working Session	Baker, Thomas R, LtCol 93 CSG/DEV	405 CD 3

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Mar 91	LTM Sampling Plan	Martin Marietta Energy Systems, Inc.	406 CD 3
01 Mar 91	TRC Meeting Minutes, 23 Jan 90	Vician, Todd M B, Lt 93 BMW/PA	407 CD 3
06 Mar 91	RPM Meeting Agenda, 13 Mar 91	Baker, Thomas R, LtCol 93 CSG/DEV	408 CD 3
13 Mar 91	Base Letter to HQ SAC Concerning Responsiveness Summary, OU-1	Cole, John R, LtCol 93 CSG/DE	409 CD 3
18 Mar 91	Base Memorandum Concerning CRWQCB Comments, North Landfill Zone	Baker, Thomas R, LtCol 93 CSG/DEV	410 CD 3
18 Mar 91	SWAT Report, West Landfill Zone	Kleinfelder, Inc.	411 CD 3
20 Mar 91	Base Letter to EPA and CDHS Concerning Comments on Draft Final LTM Sampling Plan	Baker, Thomas R, LtCol 93 CSG/DEV	412 CD 3
25 Mar 91	EPA Letter to Base Concerning Air Stripper Emissions Remediation, OU-1	Work, Michael EPA Region IX	414 CD 3
26 Mar 91	Base Letter to EPA Concerning Naming of OUs	Baker, Thomas R, LtCol 93 CSG/DEV	415 CD 3
29 Mar 91	Base Letter to CRWQCB Concerning Responses to Comments on Draft Report on West Landfill Zone	Chan, Arthur D 93 CSG/DEV	416 CD 3
Apr 91	Fact Sheet, Base Environmental Update, Apr 91	93 BMW/PA	417 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
01 Apr 91	Northeast Research Tabular Data and Mass Spectra for PETREX Samples	Northeast Research Institute, Inc.	419 CD 3
08 Apr 91	ROD, Interim, Draft, OU-1	IT Corp.	418 CD 3
08 Apr 91	Environmental Information Form, Appendix H	Baker, Thomas R, LtCol 93 CSG/DEV	420 CD 3
11 Apr 91	EPA Letter to Base Concerning Approval of Final LTM Sampling Plan	Work, Michael EPA Region IX	421 CD 3
16 Apr 91	Soil Analytical Results, Step 2	EPA Region IX	422 CD 3
19 Apr 91	Kleinfelder Letter to Base Concerning Response to CRWQCB Comments on SWAT Report North Landfill Zone	Carey, Russell O Kleinfelder, Inc.	423 CD 3
19 Apr 91	SWAT Report, Landfill 3, LF-06	Kleinfelder, Inc.	424 CD 3
19 Apr 91	SWAT Report, North Landfill Zone	Kleinfelder, Inc.	425 CD 3
22 Apr 91	Newspaper Article, "$100 Million Cleanup Looms for Castle"	Lopez, Pablo Thome, Joe The Modesto Bee	426 CD 3
23 Apr 91	RI/FS Project Meeting Minutes, 13 Mar 91	Baker, Thomas R, LtCol 93 CSG/DEV	427 CD 3
26 Apr 91	Base Letter to EPA and CDHS Concerning Comments on Proposed IAG Schedule	Kehoe, Michael J, Col 93 CSG/CV	429 CD 3

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29 Apr 91	RPM Meeting Agenda, 08 May 91	Baker, Thomas R, LtCol 93 CSG/DEV	431 CD 3
30 Apr 91	CDHS Letter to Base Concerning Comments on ROD, Draft, OU-1	Wang, David California Department of Health Services	432 CD 3
May 91	Limited Record Search Report	IT Corp.	433 CD 3
May 91	Rough Draft Development and Screening Report, 35 Investigative Sites	IT Corp.	435 CD 3
01 May 91	Draft Basis of Design Report, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	656 CD 3
02 May 91	Base Letter to CRWQCB Concerning Comments on Final Presentation on Landfill 3 SWAT Studies, LF-3	Baker, Thomas R, LtCol 93 CSG/DEV	436 CD 3
02 May 91	Martin Marietta Memorandum Concerning Overview of Meeting with CDM and Woodward Clyde, 16-17 Apr 91	Wilder, William L Martin Marietta Energy Systems, Inc.	437 CD 3
07 May 91	Newspaper Article, "Treated Castle Water Could Irrigate Crops"	De La Cruz, Mike The Merced Sun Star	438 CD 3
08 May 91	Base Letter to CDHS Concerning Response to Comments on Work Plan No 2	Baker, Thomas R, LtCol 93 CSG/DEV	439 CD 3
14 May 91	Newspaper Article, "Use of Castle Water Awaits State OK"	Rocha, Elisa The Fresno Bee	440 CD 3

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14 May 91	Newspaper Article, "Merced Wants to Use Castle Water"	Rocha, Elisa The Modesto Bee	441 CD 3
14 May 91	SWAT Report, South Landfill Zone	Kleinfelder, Inc.	442 CD 3
15 May 91	EPA Letter to Base Concerning Comments on RPM Meeting Minutes, 23-24 Jan 91	Work, Michael EPA Region IX	443 CD 3
15 May 91	Base Letter to CDHS and EPA Concerning Rational for Location of Monitoring Wells, SD-12, (DA-4)	Baker, Thomas R, LtCol 93 CSG/DEV	444 CD 3
16 May 91	Base Letter to Martin Marietta Concerning EPA and CRWQCB Comments on RPM Meeting Minutes, 23-24 Jan 91	Baker, Thomas R, LtCol 93 CSG/DEV	445 CD 3
21 May 91	CRWQCB Letter to Base Concerning Approval of Proposed Schedule Changes and Basewide RI/FS	Mosbacher, Michael H California Regional Water Quality Control Board	446 CD 3
22 May 91	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 08 May 91	Work, Michael EPA Region IX	447 CD 3
23 May 91	EPA Letter to Base Concerning Comments on ROD, Draft, OU-1	Work, Michael EPA Region IX	448 CD 3
24 May 91	CDHS Letter to Base Concerning Review of Base Response to Comments on Work Plan No 2	Wang, David California Department of Health Services	279 CD 2
24 May 91	Base Letter to CRWQCB Concerning Comments on SWAT Final Report, South Landfill Zone	Chan, Arthur D 93 CSG/DEV	449 CD 3

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28 May 91	Base Letter to EPA and CDHS Concerning Revised IAG Schedule	Kehoe, Michael J, Col 93 CSG/CV	450 CD 3
29 May 91	FTA-1 Site Description, FT-01	IT Corp.	434 CD 3
29 May 91	Base Letter to IT Corp Concerning Comments on RPM Draft Meeting Minutes, 08 May 91	Baker, Thomas R, LtCol 93 CSG/DEV	452 CD 3
30 May 91	Base Letter to Martin Marietta Concerning Regulatory Comments on ROD, Draft, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	453 CD 3
01 Jun 91	TRC Meeting Minutes, 24 Apr 91	Leong, Linda L, Maj 93 BMW/PA	454 CD 3
01 Jun 91	Newspaper Article, "Should Castle Treat, Sell Tainted Water for Crop Irrigation"	Hubbard, Greg The Merced Sun Star	455 CD 3
01 Jun 91	Newspaper Article, "Treated Toxic Water Earmarked..."	The Merced Sun Star	456 CD 3
04 Jun 91	Base Letter to CDHS Concerning Response to Comments on ROD, Interim, OU-1	Martinez, Pablo A 93 CSG/EM	458 CD 3
07 Jun 91	Base Letter to EPA Concerning Request for Information on Sampling Plan for Round 7 Groundwater Sampling	Chan, Arthur D 93 CSG/DEV	459 CD 3
12 Jun 91	Base Letter to CRWQCB Concerning ARARs, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	460 CD 3
17 Jun 91	RPM Meeting Agenda, 27 Jun 91	Baker, Thomas R, LtCol 93 CSG/DEV	462 CD 3

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
18 Jun 91	Background Sample North of Castle Vista Landfill	BSK Analytical Laboratories	461 CD 3
27 Jun 91	RPM Meeting Minutes, 27 Jun 91	93 CSG/DEVR	464 CD 3
Jul 91	Draft Technical Memorandum Report, Two 30 Day Pump Tests	IT Corp.	466 CD 3
Jul 91	Data Report, 15 VOC Probes Drilled in OT-30 Area	IT Corp.	467 CD 3
01 Jul 91	Newspaper Article, "Castle Cleanup Bill Still Under Debate"	Chan, Cecilia The Merced Sun Star	468 CD 3
08 Jul 91	ROD, Interim, OU-1	IT Corp.	469 CD 3
10 Jul 91	Newspaper Article, "City Tests New Well Site"	Sanders, Tammy S The Atwater Signal	470 CD 3
12 Jul 91	Environmental Checklist Form, Appendix I	California Department of Health Services	471 CD 3
12 Jul 91	RPM Draft Meeting Minutes, 28 Jun 91	Baker, Thomas R, LtCol 93 CSG/DEV	472 CD 3
12 Jul 91	Base Letter to EPA and CDHS Concerning Draft Baseline Risk Assessment, OU-2	Baker, Thomas R, LtCol 93 CSG/DEV	473 CD 3
18 Jul 91	EPA Letter to Base Concerning Late Receipt of Draft Risk Assessment and FFA Schedule, OU-2	Work, Michael EPA Region IX	475 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
19 Jul 91	Newspaper Article, "Castle Water Recycled"	The Modesto Bee	476 CD 3
19 Jul 91	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 27 Jun 91	Work, Michael EPA Region IX	477 CD 3
23 Jul 91	EPA Letter to Base Concerning Preliminary Comments on ROD, Draft Final, OU-1	Work, Michael EPA Region IX	478 CD 3
29 Jul 91	EPA Letter to Base Concerning Comments on ROD, Draft Final, OU-1	Work, Michael EPA Region IX	479 CD 3
30 Jul 91	Fact Sheet, Base Environmental Update, 30 Jul 91	93 BMW/PA	480 CD 3
Aug 91	ROD, Final Technical Document to Support NFA	CDM Federal Programs Corp.	482 CD 3
Aug 91	Draft Soil Management Plan for Waste in Drums and RI Derived Waste Originating From VOC Probes	CDM Federal Programs Corp.	483 CD 3
01 Aug 91	Newspaper Article, "Castle AFB OU-1"	The Merced Sun Star	485 CD 3
07 Aug 91	ROD, Interim, OU-1	IT Corp.	486 CD 3
07 Aug 91	EPA Letter to Base Concerning Extension, 30 Day Review Period for ROD, OU-1	Work, Michael EPA Region IX	487 CD 3
08 Aug 91	Final RPM Meeting Minutes, 27 Jun 91	Baker, Thomas R, LtCol 93 CSG/DEV	488 CD 3

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14 Aug 91	Newspaper Article, "Notice of Public Availability, Castle AFB, DA-4 RA"	The Atwater Signal	489 CD 3
15 Aug 91	Newspaper Article, "Public Hearing and Notice of Application for Waste Discharge Requirements for Dept of AF, Castle AFB, Merced County"	Pearson, J Lawrence The Merced Sun Star	490 CD 3
20 Aug 91	RPM Draft Meeting Minutes, 01 Aug 91	Baker, Thomas R, LtCol 93 CSG/DEV	491 CD 3
20 Aug 91	RD, Work Plan, OU-1	PRC Environmental Management, Inc.	492 CD 3
23 Aug 91	CDTSC Letter to Base Concerning Final FSP and QAPP, Preliminary SI	Wang, David California Department of Toxic Substances Control	428 CD 3
26 Aug 91	Base Letter to CDHS Concerning Comments on Monthly TCE Results	Baker, Thomas R, LtCol 93 CSG/DEV	430 CD 3
26 Aug 91	Base Letter to EPA Concerning Comments on Sampling Results From Groundwater Reclamation Treatment Facility, Jul 91, DA-4	Baker, Thomas R, LtCol 93 CSG/DEV	493 CD 3
Sep 91	Newspaper Article, "Castle Contamination a Concern, Inspection and Studies Precede Base Cleanup"	Hartsoe, Steve The Lesher News Service	77 CD 2
Sep 91	RI/FS, Draft Report, OU-2	Metcalf and Eddy, Inc.	495 CD 3
04 Sep 91	Newspaper Article, "Castle Cleanup Creates Concern; Toxic Plume Might Make Land Unusable When Base Closes"	The Merced Sun Star	496 CD 3

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04 Sep 91	Base Letter to EPA and CDHS Concerning Comments on Proposed Schedule for Completion of RD/RA Work Plan for Interim OU-1	Cole, John R, LtCol 93 CSG/DE	497 CD 3
04 Sep 91	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 01 Aug 91	Work, Michael EPA Region IX	498 CD 3
11 Sep 91	Base Letter to EPA Concerning Comments on RD/RA Schedule, OU-1	Chan, Arthur D 93 CSG/DEV	499 CD 3
11 Sep 91	CDHS Letter to Base Concerning Comments on Draft Soil Management Plan, Wastes in Drums and RI Derived Waste Originating From VOC Probes	Wang, David California Department of Health Services	1021 CD 4
16 Sep 91	Final RPM Meeting Minutes, 01 Apr 91	Baker, Thomas R, LtCol 93 CSG/DEV	500 CD 3
16 Sep 91	Base Letter to TRC Members Concerning TRC Charter	Vician, Todd M B, Lt 93 BMW/PA	501 CD 3
17 Sep 91	EPA Letter to Base Concerning Preliminary Comments on RI/FS, Draft Report, OU-2	Work, Michael EPA Region IX	502 CD 3
19 Sep 91	EPA Letter to Base Concerning Comments on Draft Schedule for RD/RA, OU-1	Work, Michael EPA Region IX	503 CD 3
25 Sep 91	RPM Draft Meeting Minutes, 17 Sep 91	Baker, Thomas R, LtCol 93 CSG/DEV	505 CD 3
Oct 91	Draft Work Plan, Technical and Scoping Memorandum, OU-2	Metcalf and Eddy, Inc.	506 CD 3

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Oct 91	EPA Aerial Photographic Analysis of Base	EPA Region IX	987 CD 4
01 Oct 91	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 17 Sep 91	Work, Michael EPA Region IX	507 CD 3
04 Oct 91	Base Letter to EPA Concerning RD/RA Revised Schedule, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	509 CD 3
09 Oct 91	Base Letter to CDM Concerning Comments on RPM Meeting Minutes, 17 Sep 91	Baker, Thomas R, LtCol 93 CSG/DEV	510 CD 3
09 Oct 91	RD/RA Schedule Review Meeting Minutes, 03 Oct 91	Scruggs, Mary PRC Environmental Management, Inc.	511 CD 3
10 Oct 91	Castle Joint Powers Authority Agenda	Atwater City Council Chambers	512 CD 3
10 Oct 91	Castle Joint Powers Authority Meeting Minutes, 10 Oct 91	Barrett, Frances M 93 CSG/DEVR	514 CD 3
11 Oct 91	EPA Letter to Base and HQ SAC Concerning RD/RA Proposed Schedule, OU-1	Strauss, Alexis EPA Region IX	515 CD 3
15 Oct 91	CDTSC Letter to Base Concerning Review of RI/FS, Draft Report, OU-2	Wang, David California Department of Toxic Substances Control	516 CD 3
15 Oct 91	EPA Letter to Base Concerning Comments on RI/FS, Draft Report, OU-2	Work, Michael EPA Region IX	517 CD 3

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
17 Oct 91	EPA Letter to Base Concerning Additional Groundwater RA Within Boundaries of Interim OU-1, Bldg 84	Work, Michael EPA Region IX	518 CD 3
17 Oct 91	Base Letter to EPA Concerning RD/RA, Proposed Schedule, OU-1	Kehoe, Michael J, Col 93 BMW/CV	519 CD 3
21 Oct 91	TRC Meeting Minutes, 21 Oct 90	Vician, Todd M B, Lt 93 BMW/PA	520 CD 3
21 Oct 91	CDTSC Letter to Base Concerning Revised Comments on RI/FS, Draft Report, OU-2	Wang, David California Department of Toxic Substances Control	521 CD 3
21 Oct 91	CRWQCB Letter to Base Concerning Comments on RI/FS, Draft Final Report, OU-2	Mosbacher, Michael H California Regional Water Quality Control Board	522 CD 3
24 Oct 91	Newspaper Article, "Castle AFB Announces ROD Signed"	The Merced Sun Star	523 CD 3
25 Oct 91	EPA Letter to Base Concerning Comments on RI/FS, OU-2	Work, Michael EPA Region IX	524 CD 3
28 Oct 91	EPA Letter to Base Concerning RD/RA, Schedule Conclusions, OU-1	Strauss, Alexis EPA Region IX	526 CD 3
31 Oct 91	Summary of Conference Call, Critical Issues From EPA Comments on RI/FS, Draft Report, OU-2	Wilder, William L Oak Ridge National Laboratory	529 CD 3
Nov 91	Draft Basewide Waste Management Plan	CDM Federal Programs Corp.	1022 CD 4

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
04 Nov 91	Base Letter to EPA Concerning Proposed Schedule Meeting Objectives of ROD, OU-1	Kehoe, Michael J, Col 93 CSG/CV	530 CD 3
04 Nov 91	EPA Letter to HQ SAC, CDTSC, and EPA Concerning Notice of Dispute Resolution for Interim RD/RA Schedule, OU-1	Work, Michael EPA Region IX	531 CD 3
07 Nov 91	Castle Joint Powers Authority Meeting Minutes, 07 Nov 91	Barrett, Frances M 93 CSG/DEVR	532 CD 3
16 Nov 91	RD/RA, Action Schedule Dispute Resolution Issue	California Department of Toxic Substances Control	534 CD 3
19 Nov 91	RPM Draft Meeting Minutes, 22 Oct 91	Baker, Thomas R, LtCol 93 CSG/DEV	535 CD 3
20 Nov 91	EPA Letter to Base Concerning Comments on Action Plan for Additional Domestic Well Sampling Southwest of Base	Work, Michael EPA Region IX	537 CD 3
21 Nov 91	Castle Joint Powers Authority Meeting Minutes, 21 Nov 91	Barrett, Frances M 93 CSG/DEVR	538 CD 3
21 Nov 91	PRC Letter to Base Concerning Comments on Position Paper for Interim RA Design Schedule, OU-1	Scruggs, Mary PRC Environmental Management, Inc.	539 CD 3
22 Nov 91	EPA Letter to HQ SAC Concerning Comments on Outline of Design Assumptions Acceptable to EPA in Design Report, Interim, OU-1	Work, Michael EPA Region IX	541 CD 3
22 Nov 91	Scoping Meeting Minutes on OU-2 Work Plan, 22 Nov 91	Baker, Thomas R, LtCol 93 CSG/DEV	542 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
26 Nov 91	RD/RA, Draft Preliminary Work Plan, Interim OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	481 CD 3
26 Nov 91	RD/RA, Draft Preliminary Work Plan, HSP, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	543 CD 3
Dec 91	RI/FS, Draft Final Baseline Risk Assessment, Vol I of II, OU-2	Metcalf and Eddy, Inc.	545 CD 3
Dec 91	RI/FS, Draft Final Baseline Risk Assessment, Vol II of II, OU-2	Metcalf and Eddy, Inc.	546 CD 3
03 Dec 91	EPA Letter to Base Concerning Comments on Draft Work Plan, Technical and Scoping Memorandum, OU-2	Work, Michael EPA Region IX	547 CD 3
03 Dec 91	Draft SAP Addendum for JP-4 Contaminated Soils Along West Flightline Sector	PRC Environmental Management, Inc. James M Montgomery, Inc.	548 CD 3
05 Dec 91	RA, JP-4 Contaminated Soils Along Western Flightline Sector, HSP	PRC Environmental Management, Inc. James M Montgomery, Inc.	549 CD 3
06 Dec 91	CDTSC Letter to Base Concerning Comments on Draft Work Plan and Technical Memorandum, OU-2	O'Kane, John A, Jr California Department of Toxic Substances Control	550 CD 3
06 Dec 91	PRC Letter to Base Concerning Comments on Revised Proposed Interim RA Design Schedule, OU-1	Scruggs, Mary PRC Environmental Management, Inc.	551 CD 3

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09 Dec 91	Newspaper Article, "War, Peace, and Cleanup - It's the Morning After for the Counsel Who are Helping with Military Downsizing"	Pfaff, Dennis The San Francisco Daily Journal	552 CD 3
10 Dec 91	Data Validation Summary Report for Rounds 6 and 7	IT Corp.	553 CD 3
12 Dec 91	Castle Joint Powers Authority Meeting Minutes, 12 Dec 91	Barrett, Frances M 93 CSG/DEVR	554 CD 3
16 Dec 91	EPA Letter to Base Concerning Comments on RI/FS, Draft Final Report, OU-2	Work, Michael EPA Region IX	555 CD 3
16 Dec 91	Final RPM Meeting Minutes, 22 Oct 91	Baker, Thomas R, LtCol 93 CSG/DEV	556 CD 3
18 Dec 91	EPA Letter to Base Concerning Comments on Draft Proposed Plan, OU-2	Work, Michael EPA Region IX	557 CD 3
18 Dec 91	TRC Meeting Minutes, 13 Nov 91	Kehoe, Michael J, Col 93 BMW/CV	558 CD 3
20 Dec 91	CDTSC Letter to Base Concerning Request for 30 Day Extension to Comment and Response Period for RI/FS, Draft Final Report and Proposed Plan, OU-2	Wang, David California Department of Toxic Substances Control	559 CD 3
20 Dec 91	EPA Letter to Base Concerning Comments on Aerial Photographic Analysis From EPA Environmental Monitoring Systems Laboratory	Work, Michael EPA Region IX	560 CD 3

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20 Dec 91	CDTSC Letter to EPA Concerning Request for 30 Day Extension on Comment and Response Period, RI/FS, Draft Final Report and Proposed Plan, OU-2	Wang, David California Department of Toxic Substances Control	561 CD 3
Jan 92	RI/FS, Draft Final Baseline Risk Assessment, Vol I of II, OU-2	Metcalf and Eddy, Inc.	564 CD 3
Jan 92	RI/FS, Draft Final Baseline Risk Assessment, Vol II of II, OU-2	Metcalf and Eddy, Inc.	565 CD 3
07 Jan 92	CDTSC Letter to Base Concerning Comments on RI/FS, Draft Final Report and Proposed Plan, OU-2	Mosbacher, Michael H O'Kane, John A, Jr California Department of Toxic Substances Control	566 CD 4
09 Jan 92	EPA Letter to Base Concerning Request for Delivery of RI/FS, Revised Report and Draft Final Proposed Plan	Work, Michael EPA Region IX	567 CD 4
09 Jan 92	Castle Joint Powers Authority Meeting Minutes, 09 Jan 92	93 CSG/DEVR	568 CD 4
14 Jan 92	Draft Interim Design Report, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	598 CD 3
16 Jan 92	EPA Comments on Draft Work Plan for Groundwater Plume Characterization, Scoping Memorandum, Dec 91	EPA Region IX	544 CD 3
21 Jan 92	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 17 Dec 91	Work, Michael EPA Region IX	569 CD 4

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21 Jan 92	Base Letter to Navy Concerning Comments on RD, Preliminary Draft Work Plan, Interim RA, OU-1	Chan, Arthur D 93 BMW/CVE	570 CD 4
22 Jan 92	Base Letter to Residents Concerning TCE Sampling to Monitor Quality of Drinking Water	Baker, Thomas R, LtCol 93 CSG/DEV	571 CD 4
22 Jan 92	Base Letter to Resident Concerning Monthly TCE Samples Taken to Monitor Quality of Drinking Water	Baker, Thomas R, LtCol 93 CSG/DEV	572 CD 4
22 Jan 92	TCE Test Results, Oct-Dec 91	93 CSG/DEV	573 CD 4
22 Jan 92	Base Letter to CDTSC Concerning Comments on Monthly TCE Results	Baker, Thomas R, LtCol 93 CSG/DEV	574 CD 4
22 Jan 92	Base Letter to Resident Concerning Comments on TCE Samples Taken to Monitor Drinking Water Quality	Baker, Thomas R, LtCol 93 CSG/DEV	576 CD 4
22 Jan 92	Base Letter to EPA Concerning Comments on Monthly TCE Results	Baker, Thomas R, LtCol 93 CSG/DEV	577 CD 4
22 Jan 92	Base Letter to EPA Concerning Amendments to RI/FS, Draft Final Report, OU-2	Baker, Thomas R, LtCol 93 CSG/DEV	578 CD 4
23 Jan 92	Castle Joint Powers Authority Meeting Minutes, 23 Jan 92	Barrett, Frances M 93 CSG/DEVR	580 CD 4
27 Jan 92	EPA Letter to Base Concerning Comments on Revisions to RI/FS, Draft Final Report, OU-2	Work, Michael EPA Region IX	582 CD 4

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29 Jan 92	Castle Vista Round 3 Data Validation Summary Report	IT Corp.	583 CD 4
29 Jan 92	Base Letter to EPA Concerning Comments on Draft Work Plan	Cole, John R, LtCol 93 CSG/DE	584 CD 4
29 Jan 92	CDTSC Letter to Base Concerning Review of RI/FS, Draft Final Report and Proposed Plan, OU-2	O'Kane, John A, Jr California Department of Toxic Substances Control	585 CD 4
30 Jan 92	CRWQCB Letter to Base Concerning Comments on RI/FS, Draft Final Report and Proposed Plan, OU-2	Vorster, Antonia K J California Regional Water Quality Control Board	586 CD 4
30 Jan 92	CDTSC Letter to Base Concerning Request for Extension of IAG Schedule, 29 Jan 92	Wang, David California Department of Toxic Substances Control	587 CD 4
31 Jan 92	External Scoping Meeting Minutes for OU-3, 08 Jan 92	Baker, Thomas R, LtCol 93 CSG/DEV	588 CD 4
Feb 92	VOC Probe Results	IT Corp.	589 CD 4
Feb 92	ARAR, TV Sewer Line Survey Report	IT Corp.	592 CD 3
Feb 92	Draft HSP, Groundwater Plume Characterization	CDM Federal Programs Corp. Woodward-Clyde Consultants	593 CD 3
Feb 92	Draft QAPP	CDM Federal Programs Corp. Woodward-Clyde Consultants	594 CD 3
03 Feb 92	Draft Work Plan and FSP, Vol I of III	CDM Federal Programs Corp. Woodward-Clyde Consultants	590 CD 4

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03 Feb 92	Draft Work Plan and FSP, Vol II of III	CDM Federal Programs Corp. Woodward-Clyde Consultants	591 CD 3
06 Feb 92	EPA Letter to Base Concerning Receipt of Letter Requesting Extensions to FFA Schedules for RI/FS, Draft Final Report, Draft Work Plan, and Draft Final Proposed Plan	Work, Michael EPA Region IX	595 CD 3
10 Feb 92	Base Letter to EPA Concerning Invoking of Force Majeure Due to Lack of Funding of DERA Projects	Kehoe, Michael J, Col 93 CSG/CV	596 CD 3
10 Feb 92	CDTSC Letter to Base Concerning Request for Identification of ARARs for Remediation of Groundwater Contamination, OU-2	O'Kane, John A, Jr California Department of Toxic Substances Control	597 CD 3
10 Feb 92	Interim Design Report, OU-1	PRC Environmental Management, Inc.	599 CD 3
11 Feb 92	CDPW Letter to CDHS Concerning ARARs for Remediation of Groundwater Contamination, OU-2	Fillebrown, Paul A California Department of Public Works	600 CD 3
12 Feb 92	Base Letter to EPA Concerning Working Session and RPM Meeting Minutes, 04 Feb 92	Baker, Thomas R, LtCol 93 CSG/DEV	601 CD 3
12 Feb 92	Newspaper Article, "Carbon Filters Help Castle with Groundwater Cleanup"	The Atwater Signal	602 CD 3
13 Feb 92	EPA Letter to Base Concerning Request to Rescind FFA Schedule	Work, Michael EPA Region IX	603 CD 3
13 Feb 92	Castle Joint Powers Authority Draft Meeting Minutes, 13 Feb 92	Barrett, Frances M 93 CSG/DEVR	604 CD 3

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13 Feb 92	Newspaper Article, "Castle Clean-up Steps Forward"	The Winton Times	605 CD 3
14 Feb 92	MID Letter to Base Concerning Water Quality Results, DA-4 and Wallace Road	Selb, E C Ted, III Merced Irrigation District	606 CD 3
14 Feb 92	Base Letter to EPA Concerning Proposed Plan, OU-2	Baker, Thomas R, LtCol 93 CSG/DEV	607 CD 3
21 Feb 92	EPA Letter to Base Concerning Delinquent Draft Final Proposed Plan, OU-2	Work, Michael EPA Region IX	608 CD 3
24 Feb 92	Base Letter to EPA Concerning Decision of IAG Schedule, 13 Feb 92	Kehoe, Michael J, Col 93 BMW/CV	609 CD 3
24 Feb 92	Final RPM Meeting Minutes, 17 Dec 91	Baker, Thomas R, LtCol 93 CSG/DEV	610 CD 3
25 Feb 92	CDTSC Letter to Base Concerning Force Majeure of IAG	Wang, David California Department of Toxic Substances Control	611 CD 3
25 Feb 92	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 04 Feb 92	Work, Michael EPA Region IX	612 CD 3
27 Feb 92	Castle Joint Powers Authority Meeting Minutes, 27 Feb 92	Barrett, Frances M 93 CSG/DEVR	613 CD 3
02 Mar 92	EPA Letter to Base Concerning RD, OU-2	Work, Michael EPA Region IX	614 CD 3
04 Mar 92	CRWQCB Letter to Base Concerning Comments on Draft Work Plan and FSP, Groundwater Plume Characterization	Izzo, Victor J California Regional Water Quality Control Board	615 CD 3

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04 Mar 92	APCD Letter to CDTSC Concerning ARARs for Remediation of Groundwater Contamination, OU-2	Brooks, Roland D San Joaquin Valley Air Pollution Control District	1761 CD 9
04 Mar 92	Draft Final Proposed Plan, OU-2	Metcalf & Eddy	1762 CD 9
05 Mar 92	CDTSC Letter to Base Concerning Comments on Interim Design Report, OU-1	O'Kane, John A, Jr California Department of Toxic Substances Control	616 CD 3
05 Mar 92	Newspaper Article, "Castle Cleans Groundwater"	The Atwater New Times	617 CD 3
06 Mar 92	EPA Letter to Base Concerning Comments on Draft Work Plan and FSP, Feb 92	Work, Michael EPA Region IX	618 CD 3
08 Mar 92	CRWQCB Letter to Base Concerning Proposed FFA	Pearson, J Lawrence California Regional Water Quality Control Board	619 CD 3
09 Mar 92	CRWQCB Letter to Base Concerning Interim Design Report, OU-1	Izzo, Victor J California Regional Water Quality Control Board	620 CD 3
10 Mar 92	CRWQCB Letter to CDTSC Concerning ARARs, OU-2	Izzo, Victor J California Regional Water Quality Control Board	621 CD 3
11 Mar 92	EPA Letter to Base Concerning Comments on Draft Final Proposed Plan, OU-2	Work, Michael EPA Region IX	622 CD 3
11 Mar 92	EPA Letter to Base Concerning Comments on Interim Design Report, OU-1	Work, Michael EPA Region IX	623 CD 3

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11 Mar 92	EPA Letter to HQ SAC Concerning Missed Deadlines	Anderson, Julie EPA Region IX	624 CD 3
15 Mar 92	Fact Sheet, Base Environmental Update, 15 Mar 92	93 BMW/PA	626 CD 3
17 Mar 92	EPA Letter to Base Concerning Letters on RI/FS, OU-2	Work, Michael EPA Region IX	627 CD 3
20 Mar 92	Base Letter to EPA Concerning Interim Design Report, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	628 CD 3
23 Mar 92	CDTSC Letter to Base Concerning Comments on Draft Final Proposed Plan, OU-2	O'Kane, John A, Jr California Department of Toxic Substances Control	629 CD 3
24 Mar 92	CRWQCB Letter to Base Concerning Draft Final Proposed Plan, OU-2	Izzo, Victor J California Regional Water Quality Control Board	630 CD 3
26 Mar 92	Castle Joint Powers Authority Meeting Minutes, 26 Mar 92	Barrett, Frances M 93 CSG/DEVR	631 CD 3
28 Mar 92	Newspaper Article, "Castle Backers Scrounge for Money"	Hansen, Don The Turlock Journal	632 CD 3
30 Mar 92	EPA Letter to Base Concerning Public Comment Period, OU-2	Work, Michael EPA Region IX	633 CD 3
30 Mar 92	CRWQCB Letter to Base Concerning Data Needs for ROD, OU-2	Izzo, Victor J California Regional Water Quality Control Board	634 CD 3

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31 Mar 92	CRWQCB Letter to AFRCW Concerning Proposed Modifications to IAGs to Include CRWQCB as Signatory Party	Vorster, Antonia K J California Regional Water Quality Control Board	635 CD 3
31 Mar 92	Newspaper Article, "Castle Cleanup Funding Rejected"	The Merced Sun Star	636 CD 3
31 Mar 92	Newspaper Article, "Castle Lease Could Discourage Organizations"	The Modesto Bee	637 CD 3
Apr 92	Proposed Plan, Remediation of Groundwater Contamination, Wallace Road and DA-4	93 CSG/DEVR	638 CD 3
01 Apr 92	Newspaper Article, "Joint Power Authority Hears Anti-Prison Protest, Groundwater Cleanup Stalled"	Sanders, Tammy S The Atwater Signal	639 CD 3
01 Apr 92	EPA Letter to Base Concerning Proposed Plan, OU-2	Work, Michael EPA Region IX	640 CD 3
02 Apr 92	Newspaper Article, "Lack of Money for Water Clean-up"	The Winton Times	641 CD 3
03 Apr 92	EPA Letter to Base Concerning Assessment of Stipulated Penalties	Work, Michael EPA Region IX	642 CD 3
04 Apr 92	Newspaper Article, "Lack of Funding Could Stall Castle Cleanup"	Rocha, Elisa The Modesto Bee	643 CD 3
07 Apr 92	Newspaper Article, "Lack of Funds No Problem"	The Merced Sun Star	644 CD 3
08 Apr 92	Newspaper Article, "Castle Cleanup Funding Through April"	Sanders, Tammy S The Atwater Signal	645 CD 3

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08 Apr 92	EPA Letter to Base Concerning EPA Review of Aerial Photo Analysis and Draft CSA Report	Work, Michael EPA Region IX	646 CD 3
13 Apr 92	Base Letter to EPA Concerning Development and Pump Test Water Disposition, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	647 CD 3
16 Apr 92	EPA Letter to Base Concerning Clarification of EPA Positions, OU-2	Anderson, Julie EPA Region IX	648 CD 3
17 Apr 92	Draft Proposed Plan, Containment and Remediation of Groundwater Contamination, Wallace Road Area, DA-4	EPA Region IX	649 CD 3
20 Apr 92	Base Letter to CDTSC Concerning Dispute Resolution Pursuant to FFA	Baker, Thomas R, LtCol 93 CSG/DEV	650 CD 3
22 Apr 92	Newspaper Article, "No Clean-up Unacceptable"	Fontella, Joe The Atwater Signal	651 CD 3
29 Apr 92	Newspaper Article, "Castle AFB Announces Public Meeting, Comment Period Announcement on Proposed Cleanup"	The Atwater Signal	652 CD 3
29 Apr 92	Newspaper Article, "Base Facilities to Tie Into Atwater Waste Water Treatment Plant"	Sanders, Tammy S The Atwater Signal	653 CD 3
01 May 92	Base Letter to PRC Environmental Concerning CRWQCB Approval of Discharging Water Generated During Aquifer Test, OU-1	Baker, Thomas R, LtCol 93 CSG/DEV	657 CD 3
01 May 92	PRC and JMM Responses to Comments of Interim Design Report, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	658 CD 3

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04 May 92	EPA Letter to Base Concerning Assessment of Stipulated Penalties for Late Submittal of Draft Final Work Plan	Work, Michael EPA Region IX	659 CD 3
07 May 92	Base Letter to CRWQCB Concerning Samples for 72-Hour Pump Test	Baker, Thomas R, LtCol 93 CSG/DEV	660 CD 3
07 May 92	Base Letter to EPA Concerning RPM Draft Meeting Minutes, 08 Apr 92	Baker, Thomas R, LtCol 93 CSG/DEV	661 CD 3
07 May 92	EPA Letter to Base Concerning Development of Zero-Day Schedule	Work, Michael EPA Region IX	662 CD 3
08 May 92	Newspaper Article, "Cleanup Plan Urged"	The Modesto Bee	663 CD 3
11 May 92	Newspaper Article, "Cleanup Bill Still Making Rounds"	Chan, Cecilia The Merced Sun Star	664 CD 3
12 May 92	Newspaper Article, "Public Meeting Planned"	The Merced Sun Star	665 CD 3
13 May 92	Base Letter to EPA Concerning RPM Meeting, 14 May 92	Baker, Thomas R, LtCol 93 CSG/DE	666 CD 3
14 May 92	Newspaper Article, "Castle's Proposed Water Clean-up Plan"	The Atwater New Times	667 CD 3
15 May 92	Base Letter to CDTSC Concerning Dispute Resolution Pursuant to FFA	Baker, Thomas R, LtCol 93 CSG/DE	669 CD 3
15 May 92	Base Letter to EPA Concerning Dispute Resolution Pursuant to FFA	Baker, Thomas R, LtCol 93 CSG/DEV	670 CD 3

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
20 May 92	SOW, RI/FS, OU-3 and Installation Wide	AFCEE/ESRB	673 CD 3
21 May 92	CDTSC Letter to Base Concerning Dispute Resolution	Landis, Anthony J California Department of Toxic Substances Control	671 CD 3
21 May 92	EPA Letter to Base Concerning Results of 91 EPA Field Audit, Data Validation Reports and Split Sample Analysis	Work, Michael EPA Region IX	672 CD 3
22 May 92	EPA Letter to HQ SAC and CDTSC Concerning Dispute Resolution	EPA Region IX	674 CD 3
29 May 92	HQ SAC Letter to SAF/MIQ and EPA Concerning IAG Dispute Resolution Committee	Mack, Robert D HQ SAC/CEV	675 CD 3
29 May 92	EPA Letter to Base Concerning Draft ROD and Requested Extension, OU-2	Anderson, Julie EPA Region IX	676 CD 3
29 May 92	RA, Draft Basis of Design Report, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	678 CD 3
29 May 92	RA, Draft Work Plan, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	679 CD 3
30 May 92	Newspaper Article, "Base Cleanup Considered"	The Merced Sun Star	680 CD 3
Jun 92	ROD, Draft, OU-2	EPA Region IX	681 CD 3

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03 Jun 92	CDTSC Letter to Base Concerning Comments on Proposed Plan, OU-2	Austreng, James C California Department of Toxic Substances Control	682 CD 3
03 Jun 92	CRWQCB Letter to Base Concerning Comments on Proposed Plan, OU-2	Izzo, Victor J California Regional Water Quality Control Board	683 CD 3
09 Jun 92	RPM Meeting Minutes, 02 Jun 92	Hicks, Brad 93 CSG/CEVR	684 CD 3
15 Jun 92	Base Letter to CDTSC Concerning Draft Work Plan and FSP	Baker, Thomas R, LtCol 93 CSG/DEV	685 CD 3
19 Jun 92	SAF Letter to EPA and CDTSC Concerning Dispute Resolution and Seven Day Extension	Vest, Gary D Deputy Assistant Secretary of the Air Force	686 CD 3
14 Jul 92	CRWQCB Letter to Water Quality Attorneys Concerning ARARs, SCOU	McChesney, Frances Marshack, Jon California Regional Water Quality Control Board	1189 CD 6
15 Jul 92	CRWQCB Letter to Base Concerning Draft 100% Design Documents, RA, Draft Work Plan, OU-1	Izzo, Victor J California Regional Water Quality Control Board	687 CD 3
16 Jul 92	SAF Letter to EPA and CDTSC Concerning Dispute Resolution	Vest, Gary D Deputy Assistant Secretary of the Air Force	688 CD 3
17 Jul 92	Newspaper Article, "State Issues Stern Warning on Cleanup"	The Merced Sun Star	689 CD 3

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18 Jul 92	Newspaper Article, "Castle Cleanup Boosted, Funding Vote Set Thursday"	The Merced Sun Star	690 CD 3
18 Jul 92	Newspaper Article, "State EPA Issues Warning on Some Merced Water, US Assailed for Failure in Cleanup Efforts"	Schwartz, Stephen The San Francisco Chronicle	691 CD 3
18 Jul 92	Newspaper Article, "Cash to Cleanup Castle, Congress to Boost Efforts to Remove Contamination at Bases"	Doyle, Michael The Modesto Bee	692 CD 3
18 Jul 92	Newspaper Article, "State Orders Castle Cleanup to Continue"	The Turlock Journal	693 CD 3
21 Jul 92	CDPH Letter to Base Concerning Base Landfills	Palsgaard, Jeff H California Department of Public Health	695 CD 3
22 Jul 92	IAG, FFA Under CERCLA Section 120	EPA Region IX	694 CD 3
22 Jul 92	EPA Letter to SAF/MIQ and CDTSC Concerning Dispute Resolution	McGovern, Daniel W EPA Region IX	696 CD 3
22 Jul 92	CRWRCB Letter to AFRCW Concerning Proposed Modifications to IAGs to Include CRWQCB as Signatory Parties	McChesney, Frances California Regional Water Quality Control Board	697 CD 3
28 Jul 92	EPA Letter to Base Concerning Zero-Day Based Schedule, 20 Jul 92	Work, Michael EPA Region IX	699 CD 3
29 Jul 92	Joint Power Authority Letter to Base Concerning Latest TRC Meeting	Martin, Richard D Castle Joint Powers Authority	698 CD 3

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29 Jul 92	Newspaper Article, "Atwater in Line for Big Federal Grant, $1.5 Million Would Pay to Connect Castle AFB Sewer Lines to Treatment Plant"	De La Cruz, Mike The Merced Sun Star	700 CD 3
31 Jul 92	CDTSC Letter to Base Concerning Closure of PCB Storage Area and Corrosion Control Paint Booth Water Tank	Pappas, James M California Department of Toxic Substances Control	701 CD 3
05 Aug 92	EPA Letter to Base, CRWQCB, and CDTSC Concerning Review of ROD, Draft, OU-2	Work, Michael EPA Region IX	702 CD 3
07 Aug 92	ROD Responsiveness Summary Report, OU-2	93 BMW/CVE	703 CD 3
10 Aug 92	Draft Final Basis of Design Report, OU-1	PRC Environmental Management, Inc. James M Montgomery, Inc.	704 CD 3
10 Aug 92	Draft Final Basis of Design Report, OU-1, Appendix C	PRC Environmental Management, Inc. James M Montgomery, Inc.	705 CD 3
11 Aug 92	EPA Letter to Base Concerning Revised FFA Schedule, 14 Aug 92	Work, Michael EPA Region IX	706 CD 3
11 Aug 92	CRWQCB Letter to EPA Concerning Comments Deadline for Draft ROD, OU-2	Izzo, Victor J California Regional Water Quality Control Board	707 CD 3
11 Aug 92	CDTSC Letter to EPA Concerning Comments on ROD, Draft, OU-2	Austreng, James C California Department of Toxic Substances Control	708 CD 3

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11 Aug 92	PRC Letter to Base Concerning Response to EPA Comments on Draft 100% Design Documents and RA, Draft Work Plan, OU-1	Scruggs, Mary PRC Environmental Management, Inc.	709 CD 3
12 Aug 92	EPA Letter to Base Concerning Review of Draft Meeting Minutes, 29 Jul 92	Work, Michael EPA Region IX	710 CD 3
13 Aug 92	Base Letter to EPA Concerning Comments on ROD, Draft, OU-2	Hicks, Brad 93 CSG/DEVR	712 CD 3
13 Aug 92	EPA Letter to Base Concerning RA, Draft Memorandum, SS-61	Work, Michael EPA Region IX	1193 CD 6
14 Aug 92	CRWQCB Letter to Base Concerning Comments on ROD, Draft, OU-2	Izzo, Victor J California Regional Water Quality Control Board	713 CD 3
18 Aug 92	RPM Conference Call Meeting Minutes, 30 Jul 92	Scruggs, Mary PRC Environmental Management, Inc.	714 CD 3
18 Aug 92	EPA Letter to Base, CDTSC, and CRWQCB Concerning Request for Review of Draft Responsiveness Summary, OU-2, 09 Sep 92	Work, Michael EPA Region IX	715 CD 3
20 Aug 92	EPA Letter to Base Concerning Draft OU-1 100% Design Report and Contractor Response to EPA Comments	Work, Michael EPA Region IX	716 CD 3
28 Aug 92	RA, Draft Final Work Plan, OU-1	PRC Environmental Management, Inc.	717 CD 3
28 Aug 92	RA, Draft Final Basis of Design Report, Vol I of II, OU-1	PRC Environmental Management, Inc.	718 CD 3

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28 Aug 92	RA, Draft Final Basis of Design Report, Vol II of II, Appendix C, OU-1	PRC Environmental Management, Inc.	719 CD 3
Sep 92	Base Comments Concerning Design, OU-1	Hicks, Brad 93 CES/DEVR	720 CD 3
Sep 92	ROD, Draft Final, OU-2	EPA Region IX	726 CD 3
03 Sep 92	CRWQCB Letter to Base Concerning Comments on Draft Responsiveness Summary, OU-2	Izzo, Victor J California Regional Water Quality Control Board	721 CD 3
04 Sep 92	SOW, RI/FS, Installation Wide	93 CES/CEVR	958 CD 3
08 Sep 92	CRWQCB Letter to Base Concerning Free Floating Product at Monitoring Well #120, Affect on Treatment Systems, Bldg 84, OU-1	Izzo, Victor J California Regional Water Quality Control Board	722 CD 3
10 Sep 92	HQ EPA Letter to SAF/MIQ and CDTSC Concerning Base Dispute Resolution	McCall, Thomas L, Jr HQ USEPA	723 CD 3
11 Sep 92	CRWQCB Letter to Base Concerning Review of RA Memorandum, Bldg 84	Izzo, Victor J California Regional Water Quality Control Board	724 CD 3
14 Sep 92	Base Letter to Regulators Concerning Installation Wide Work Plan	Cole, John R, LtCol 93 BMW/CVE	40 CD 2
21 Sep 92	EPA Letter to Base Concerning Comments on Draft Final 100% Design Report, OU-1	Work, Michael EPA Region IX	727 CD 3

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
21 Sep 92	EPA Letter to Base Concerning ROD, Draft Final, OU-2	Work, Michael EPA Region IX	728 CD 3
22 Sep 92	CRWQCB Draft Memorandum Concerning Effluent Discharge Standards, OU-1	Izzo, Victor J California Regional Water Quality Control Board	729 CD 3
24 Sep 92	Base Letter to Regulators Concerning Retraction of ROD, Draft Final, OU-2	Cole, John R, LtCol 93 BMW/CVE	730 CD 3
24 Sep 92	EPA Letter to Base Concerning Conference Call and Comments on Draft Final 100% Design Report, OU-1	Work, Michael EPA Region IX	731 CD 3
25 Sep 92	EPA Letter to Base Concerning Base Cleanup Information	Takata, Keith EPA Region IX	732 CD 3
28 Sep 92	Base Letter to Regulators Concerning Proposed FFA Schedule	Cole, John R, LtCol 93 BMW/CVE	733 CD 3
29 Sep 92	CDTSC Letter to Base and EPA Concerning Dispute Resolution	Wang, David California Department of Toxic Substances Control	734 CD 3
29 Sep 92	RA, Final Basis of Design Report, Vol II of II, Appendix C, OU-1	PRC Environmental Management, Inc.	735 CD 3
30 Sep 92	Base Letter to EPA and CDTSC Concerning Issues of Dispute Resolution Committee	Cole, John R, LtCol 93 BMW/CVE	736 CD 3
30 Sep 92	CDTSC Letter to HQ/ACC Concerning Dispute Resolution	Wang, David California Department of Toxic Substances Control	737 CD 3

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Oct 92	ROD, Draft Final, OU-2	93 BMW/CVE	197 CD 2
Oct 92	ROD, Draft Final, OU-2	93 CES/CEV	739 CD 3
06 Oct 92	CRWQCB Letter to Base, EPA, and CDTSC Concerning Pre-Meeting on Dispute of RD, Report and RA, Work Plan, OU-1	Izzo, Victor J California Regional Water Quality Control Board	740 CD 3
09 Oct 92	EPA Letter to Base Concerning Comments on Draft RPM Meeting Minutes, 16 Sep 92	Work, Michael EPA Region IX	742 CD 3
13 Oct 92	EPA Letter to Base Concerning Comments on Draft Proposed FFA Schedule	Work, Michael EPA Region IX	743 CD 3
14 Oct 92	HQ ACC Letter to CDTSC and EPA Concerning Dispute, OU-1	HQ ACC/CEV	744 CD 3
15 Oct 92	Newspaper Article, "Bill Would Free Up Clean Parts of Castle, Legislation Now on President's Desk"	The Merced Sun Star	745 CD 3
20 Oct 92	EPA Letter to HQ ACC and CDTSC Concerning Dispute Resolution for RD, OU-1	Takata, Keith EPA Region IX	747 CD 3
21 Oct 92	RPM Meeting Agenda, 04 Nov 92	Cole, John R, LtCol 93 BMW/CVE	748 CD 3
23 Oct 92	RPM Meeting Minutes, 16 Sep 92	Cole, John R, LtCol 93 BMW/CVE	749 CD 3
26 Oct 92	Base Letter to Regulators Concerning Proposed FFA Schedule	Baker, Thomas R, LtCol 93 BMW/CVE	750 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
29 Oct 92	Newspaper Article, "Base Cleanup Efforts Accelerated, Air Force Wants Polluted Facility Suitable for New Occupants by 95"	De La Cruz, Mike The Merced Sun Star	751 CD 3
29 Oct 92	EPA Letter to Base Concerning Comments on ROD, Draft Final, OU-2	Work, Michael EPA Region IX	752 CD 3
Nov 92	Working Copy, QAPP, SCOU	Jacobs Engineering Group, Inc.	753 CD 5
Nov 92	Stage 5, Draft HSP, SCOU	Jacobs Engineering Group, Inc.	754 CD 5
Nov 92	Installation Wide Contaminant Source Assessment Study, Vol I of II	Jacobs Engineering Group, Inc.	755 CD 5
Nov 92	Installation Wide Contaminant Source Assessment Study, Vol II of II	Jacobs Engineering Group, Inc.	756 CD 5
Nov 92	SAP, SCOU	Jacobs Engineering Group, Inc.	757 CD 5
02 Nov 92	Base Letter to Regulators Concerning EPA Comments on ROD, Draft Final, OU-2	Baker, Thomas R, LtCol 93 CES/CEVR	759 CD 3
03 Nov 92	CRWQCB Letter to HQ ACC, EPA, and CDTSC Concerning Dispute Resolution, OU-1	Pearson, J Lawrence California Regional Water Quality Control Board	760 CD 3
04 Nov 92	RPM Meeting Minutes, 04 Nov 92	Reith, Charles Jacobs Engineering Group, Inc.	761 CD 3
04 Nov 92	HQ USEPA Letter to SAF/MIQ and CDTSC Concerning Dispute Resolution	McCall, Thomas L, Jr HQ USEPA	762 CD 3

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04 Nov 92	EPA Letter to HQ ACC and CDTSC Concerning Dispute Resolution of Interim OU-1 100% RD, Draft Final Report and RA, Work Plan	Takata, Keith EPA Region IX	763 CD 3
05 Nov 92	CDTSC Letter to EPA and HQ ACC Concerning Dispute Resolution	Ward, Daniel T California Department of Toxic Substances Control	767 CD 4
05 Nov 92	CRWQCB Letter to Base Concerning Approval of RA, Bldg 84	Izzo, Victor J California Regional Water Quality Control Board	768 CD 4
09 Nov 92	EPA Letter to Base Concerning Comments on Draft Final FFA Schedule	Work, Michael EPA Region IX	770 CD 4
09 Nov 92	Fact Sheet, Base Environmental Update, 09 Nov 92	93 BW/PA	784 CD 3
11 Nov 92	Draft Working Copy, QAPP, SCOU	Jacobs Engineering Group, Inc.	771 CD 4
20 Nov 92	EPA Letter to Base Concerning Comments on RD/RA, Draft Preliminary Accelerated Schedule, OU-2	Work, Michael EPA Region IX	772 CD 3
23 Nov 92	HQ ACC Letter to Regulators Concerning Unanimous Opinion of Dispute Resolution Committee, OU-1	Moore, Robert M HQ ACC/CEVR	773 CD 3
25 Nov 92	EPA Letter to HQ ACC, CDTSC, and CRWQCB Concerning Dispute Resolution, ROD, OU-2	Takata, Keith EPA Region IX	774 CD 3

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27 Nov 92	Newspaper Article, "Public Notice, Intent to Operate Liquid Granular Activated Carbon Filter"	The Merced Sun Star	775 CD 3
27 Nov 92	Base Letter to Navy Concerning Modification of Design Documents, OU-1	Baker, Thomas R, LtCol 93 CES/CEV	776 CD 3
Dec 92	Draft QAPP, SCOU	Jacobs Engineering Group, Inc.	781 CD 3
02 Dec 92	Newspaper Article, "Public Notice on the Intent to Operate Liquid Granular Activated Carbon Filter at CAFB"	The Atwater Signal	777 CD 3
03 Dec 92	CDTSC Letter to Base Concerning NOD for Draft PCB Closure Plan	Hong, Eric California Department of Toxic Substances Control	787 CD 3
04 Dec 92	Newspaper Article, "Funds for Base Cleanup"	The Merced Sun Star	778 CD 3
10 Dec 92	Newspaper Article, "Castle AFB Receives $21 Million for Cleanup"	The Winton Times	779 CD 3
10 Dec 92	RA, Final Basis of Design Report, Vol I of II, OU-1	PRC Environmental Management, Inc.	782 CD 3
10 Dec 92	RA, Final Work Plan, OU-1	PRC Environmental Management, Inc.	783 CD 3
14 Dec 92	SOW, Title I Services for Groundwater Treatment, OU-2 and Title II Services for Groundwater Treatment, OU-1	Jacobs Engineering Group, Inc.	946 CD 3

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15 Dec 92	CRWQCB Letter to Base Concerning Draft Update of Monitoring and Reporting Program of Board Order Number	Izzo, Victor J California Regional Water Quality Control Board	785 CD 3
16 Dec 92	Newspaper Article, "Castle Gets Cleanup Funding"	Parker, Scarlette P, TSgt The Atwater Signal	786 CD 3
24 Dec 92	Behavior of Eight Inches Diameter Monitoring Well, DA4-1	Martinez, Pablo A 93 CES/CEV	795 CD 3
05 Jan 93	TRC Meeting Minutes, 18 Nov 92	Bishop, Raymond C, Col 93 BW/CV	788 CD 3
06 Jan 93	RPM Meeting Agenda, 20 Jan 93	Cole, John R, LtCol 93 BW/CVE	789 CD 3
11 Jan 93	EPA Letter to Base Concerning Draft QAPP	Work, Michael EPA Region IX	790 CD 3
12 Jan 93	EPA Letter to HQ ACC, CDTSC, and CRWQCB Concerning Dispute Resolution, ROD, OU-2	Takata, Keith EPA Region IX	791 CD 3
14 Jan 93	CDTSC Letter to EPA Concerning Dispute Resolution, ROD, OU-2	Wang, David California Department of Toxic Substances Control	792 CD 3
20 Jan 93	Consensus Statement, Major Deficiencies of Work Plan, SCOU	Work, Michael Austreng, James C Izzo, Victor J EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	793 CD 3

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20 Jan 93	RPM Draft Meeting Minutes, 20 Jan 93	93 CES/CEV	794 CD 3
20 Jan 93	Base Letter to CRWQCB Concerning GAC Unit Taken Off Line, Bldg 84	Cole, John R, LtCol 93 BW/CVE	942 CD 3
Feb 93	RI, Advance Draft Comprehensive Basewide Groundwater, QAPP, Vol I of II	Jacobs Engineering Group, Inc.	796 CD 3
Feb 93	RI, Advance Draft Comprehensive Basewide Groundwater, SAP, Vol II of II	Jacobs Engineering Group, Inc.	797 CD 3
Feb 93	RD, Draft Work Plan, OU-2	Jacobs Engineering Group, Inc.	798 CD 3
Feb 93	Draft Conceptual Design Support Document Technical Memorandum Report, OU-2	Jacobs Engineering Group, Inc.	799 CD 3
Feb 93	Base Letter to CDTSC Concerning Response to NOD on Draft Closure Plan, PCB Storage Facility	Cole, John R, LtCol 93 BW/CVE	812 CD 3
Feb 93	RI, Comprehensive Basewide Groundwater HSP	Jacobs Engineering Group, Inc.	959 CD 4
03 Feb 93	Base Letters to Residents Concerning Sampling Results	Baker, Thomas R, LtCol 93 CES/CEV	801 CD 3
04 Feb 93	EPA Letter to Base Concerning Comments on Draft Meeting Minutes, 04 Feb 93	Work, Michael EPA Region IX	802 CD 3
08 Feb 93	Base Letter to Regulators Concerning RD/RA, Draft Final Schedule, OU-2	Cole, John R, LtCol 93 BW/CVE	803 CD 3

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08 Feb 93	Final RPM Meeting Minutes, 04 Nov 92	Baker, Thomas R, LtCol 93 CES/CEV	804 CD 3
09 Feb 93	EPA Letter to Base Concerning Comments on Draft Meeting Minutes, 20 Jan 93	Work, Michael EPA Region IX	805 CD 3
09 Feb 93	MDPH Letter to EPA Concerning Base Cleanup Levels	Palsgaard, Jeff H Merced County Department of Public Health	806 CD 3
12 Feb 93	RI/FS, Draft Amendments to Comprehensive Work Plan	James M Montgomery, Inc.	807 CD 3
15 Feb 93	CDTSC Letter to Base Concerning Comments on Work Plan, SCOU	Austreng, James C California Department of Toxic Substances Control	808 CD 3
16 Feb 93	CRWQCB Memorandum Concerning Work Plan, SCOU	Izzo, Victor J California Regional Water Quality Control Board	809 CD 3
16 Feb 93	EPA Letter to Base Concerning Comments on Draft Work Plan, SCOU	Work, Michael EPA Region IX	810 CD 3
16 Feb 93	CRWQCB Letter to Base Concerning Draft Work Plan, SCOU	Izzo, Victor J California Regional Water Quality Control Board	811 CD 3
19 Feb 93	CDTSC Letter to EPA Concerning Extension of Review Period, OU-2	Wang, David California Department of Toxic Substances Control	813 CD 3
22 Feb 93	EPA Letter to Base Concerning Work Plan and Universe of Potential Sources, SCOU	Work, Michael EPA Region IX	814 CD 3

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22 Feb 93	EPA Letter to Base Concerning Need for Chromium Groundwater Sampling	Work, Michael EPA Region IX	815 CD 3
23 Feb 93	Base Letter to Regulators Concerning Phone Conversation on Approval of Contaminated Groundwater Disposal	Baker, Thomas R, LtCol 93 CES/CEV	816 CD 3
23 Feb 93	EPA Letter to Base Concerning Comments on Example FSP Package and Proposed Approach for Work Plan, SCOU	Work, Michael EPA Region IX	817 CD 3
Mar 93	Stage 5, Draft HSP, SCOU	Jacobs Engineering Group, Inc.	818 CD 5
Mar 93	RI, Draft Comprehensive Basewide Groundwater SAP, Vol I of II	Jacobs Engineering Group, Inc.	819 CD 5
Mar 93	RI, Draft Comprehensive Basewide Groundwater SAP, Vol II of II	Jacobs Engineering Group, Inc.	820 CD 3
Mar 93	RI/FS, Work Plan and SAP Table of Contents, SCOU	Jacobs Engineering Group, Inc.	845 CD 3
01 Mar 93	MDPH Letter to Resident Concerning Response to Comments	Palsgaard, Jeff H Merced County Department of Public Health	821 CD 3
01 Mar 93	EPA Draft Preliminary Remediation Goals Table Report Update	EPA Region IX	826 CD 3
03 Mar 93	CRWQCB Letter to Base Concerning Comments on Example FSP, Disposal Area 3	Izzo, Victor J California Regional Water Quality Control Board	822 CD 3

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04 Mar 93	EPA Letter to Base Concerning Comments on Work Plan, SCOU	Work, Michael EPA Region IX	823 CD 3
08 Mar 93	EPA Letter to MDPH Concerning Letters, 09 and 11 Feb 93	Work, Michael EPA Region IX	825 CD 3
09 Mar 93	CDTSC Letter to Base Concerning Comments on Conceptual Site Model and Site Specific FSP	Austreng, James C California Department of Toxic Substances Control	827 CD 3
09 Mar 93	EPA Letter to Base Concerning Late Delivery and Incomplete Submission of RI/FS, Draft Basewide Work Plan	Work, Michael EPA Region IX	828 CD 3
11 Mar 93	Base Letter to Regulators Concerning RI/FS, Draft Comprehensive Basewide Work Plan	Cole, John R, LtCol 93 BW/CVE	829 CD 3
11 Mar 93	EPA Letter to Base Concerning Draft Work Plan, SCOU	Work, Michael EPA Region IX	830 CD 3
15 Mar 93	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 18 Feb 93	Work, Michael EPA Region IX	832 CD 3
17 Mar 93	CIWMB Letter to Base Concerning Landfill Areas 1-5	Johnson, Albert M California Integrated Waste Management Board	833 CD 3
19 Mar 93	Fact Sheet, Base Environmental Update, 19 Mar 93	93 BW/PA	834 CD 3
22 Mar 93	EPA Letter to HQ ACC, CDTSC, and CRWQCB Concerning Dispute Resolution, ROD, OU-2	Takata, Keith EPA Region IX	835 CD 3

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22 Mar 93	Base Letter to Residents Concerning Comments on Results From Well Water Sampling	Baker, Thomas R, LtCol 93 CES/CEV	836 CD 3
23 Mar 93	Newspaper Article, "Cleanup Efforts at Castle Continue"	Lindsay, Alvie The Modesto Bee	838 CD 3
24 Mar 93	CDTSC Letter to EPA Concerning Extension of Review Period, OU-2	Wang, David California Department of Toxic Substances Control	839 CD 3
31 Mar 93	Bechtel Letter to EPA Concerning TRC Comments on Draft FSP, SCOU	Haskins, Greg Bechtel Environmental, Inc.	844 CD 3
Apr 93	RI/FS, Draft Final QAPP, Vol I of II	Jacobs Engineering Group, Inc.	840 CD 3
Apr 93	RI/FS, Draft Final QAPP, Vol II of II	Jacobs Engineering Group, Inc.	841 CD 3
Apr 93	Site Construction Quality Plan	EA Engineering, Science, and Technology, Inc.	960 CD 4
Apr 93	RI/FS, Draft Final Work Plan, SAP, SCOU	Jacobs Engineering Group, Inc.	961 CD 5
01 Apr 93	Base Letter to Residents Concerning Comments on Monthly TCE Samples	Baker, Thomas R, LtCol 93 CES/CEV	843 CD 3
06 Apr 93	EPA Letter to Base Concerning Comments on Universe of Sites, SCOU	Work, Michael EPA Region IX	846 CD 3
07 Apr 93	HQ ACC Letter to EPA Concerning Concurrence with 60 day review extension for Dispute Resolution, ROD, OU-2	Mogge, John W, Col HQ ACC/CEV	847 CD 3

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09 Apr 93	CRWQCB Letter to Base Concerning ARARs, SCOU	Izzo, Victor J California Regional Water Quality Control Board	848 CD 3
12 Apr 93	EPA Letter to Base Concerning Comments on FSP, North and East Base Sectors	Work, Michael EPA Region IX	850 CD 3
14 Apr 93	EPA Letter to Base Concerning Comments on Conceptual Design Support Technical Memorandum, OU-2	Work, Michael EPA Region IX	851 CD 3
15 Apr 93	Base Letter to CDTSC Concerning Draft Closure Plan, Former PCB Storage Facility	Baker, Thomas R, LtCol 93 CES/CEV	852 CD 3
19 Apr 93	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 25 Mar 93	Work, Michael EPA Region IX	853 CD 3
23 Apr 93	EPA Letter to Resident Concerning Response to Questions on Base Contamination	Work, Michael EPA Region IX	854 CD 3
26 Apr 93	Base Letter to Regulators Concerning FFA Schedule	Cole, John R, LtCol 93 BW/CVE	855 CD 3
29 Apr 93	Base Letter to Resident Concerning Well Sampling	Baker, Thomas R, LtCol 93 CES/CEV	856 CD 3
30 Apr 93	CRWQCB Letter to Base Concerning Comments on Draft Final FSP, SCOU, North and East Base Sectors	Izzo, Victor J California Regional Water Quality Control Board	857 CD 3
May 93	Draft Final Conceptual Design Support Document Technical Memorandum Report, OU-2	Jacobs Engineering Group, Inc.	858 CD 3

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01 May 93	TRC Meeting Minutes, 24 Mar 93	93 BW/PA	859 CD 3
03 May 93	CRWQCB Letter to Base Concerning RI, Draft Comprehensive Basewide Groundwater Work Plan	Izzo, Victor J California Regional Water Quality Control Board	860 CD 3
03 May 93	EPA Letter to Base Concerning Comments on Comprehensive Basewide Work Plan	Work, Michael EPA Region IX	861 CD 3
03 May 93	CDTSC Letter to Base Concerning Comments on RI, Comprehensive Basewide Groundwater SAP	Austreng, James C California Department of Toxic Substances Control	862 CD 3
04 May 93	Base Letter to CDTSC Concerning Plans and Specifications for Project Titled Upgrade and Closure Plan, OWS	Baker, Thomas R, LtCol 93 CES/CEV	863 CD 3
07 May 93	EPA Letter to Base Concerning Review and Finalization of SCOU Work Plan	Work, Michael EPA Region IX	864 CD 3
07 May 93	MDPH Letter to Base Concerning RI, Comprehensive Basewide Groundwater SAP	Palsgaard, Jeff H Merced County Department of Public Health	865 CD 3
10 May 93	RPM Draft Meeting Minutes, 29 Apr 93	Watkin, Geoff W Jacobs Engineering Group, Inc.	866 CD 3
11 May 93	EPA Letter to Base Concerning Request to Extend Period for Finalization of Draft Final Work Plan, SCOU	Work, Michael EPA Region IX	867 CD 3
12 May 93	EPA Letter to Base Concerning Comments on Draft Final Work Plan, SCOU	Work, Michael EPA Region IX	868 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
13 May 93	Base Letter to Regulators Concerning Agreement to Extend Period for Finalization of Draft Final Work Plan, SCOU	Cole, John R, LtCol 93 BW/CVE	869 CD 3
13 May 93	EPA Letter to Base Concerning Need for Delineation of Wetlands	Work, Michael EPA Region IX	870 CD 3
13 May 93	HQ ACC Letter to EPA Concerning Dispute Resolution, ROD, OU-2	Mogge, John W, Col HQ ACC/CEV	871 CD 3
13 May 93	CDTSC Letter to Base Concerning Permitting and Site Mitigation Activities	Pappas, James M California Department of Toxic Substances Control	1023 CD 4
14 May 93	Base Letter to CRWQCB Concerning Waste Soil Disposal, OU-2	Cole, John R, LtCol 93 BW/CVE	872 CD 3
17 May 93	CDTSC Letter to Base Concerning Comments on Draft Final Work Plan, SAP, SCOU	Austreng, James C California Department of Toxic Substances Control	873 CD 3
18 May 93	CRWQCB Letter to Base Concerning Draft Final Work Plan, SCOU	Izzo, Victor J California Regional Water Quality Control Board	874 CD 3
18 May 93	Base Letter to CRWQCB Concerning Waste Water Disposal, OU-2	Cole, John R, LtCol 93 BW/CVE	875 CD 3
18 May 93	Technical Memorandum Report, Air Stripper Pilot Study, OU-1	PRC Environmental Management, Inc.	876 CD 3
18 May 93	Technical Memorandum Report, Aquifer Pumping Test, OU-1	PRC Environmental Management, Inc.	877 CD 3

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19 May 93	Newspaper Article, Various Articles on Base Closure and Reuse	The Modesto Bee The Atwater Signal	109 CD 2
20 May 93	Newspaper Article, "Locals Testify Before Senate Base Closure Committee"	Hartsoe, Steve The Winton Times	137 CD 2
20 May 93	Newspaper Article, "Joint Power Authority Proposes a Mixed Bag of Activities"	Hartsoe, Steve The Winton Times	194 CD 2
20 May 93	Newspaper Article, "A View from the Inside"	Cardoza, Dennis The Winton Times	212 CD 2
21 May 93	EPA Letter to Base Concerning Comments on Revised Conceptual Design Support Technical Memorandum, OU-2	Work, Michael EPA Region IX	878 CD 3
24 May 93	EPA Letter to Base Concerning RPM Draft Meeting Minutes, 29 Apr 93	Work, Michael EPA Region IX	879 CD 3
26 May 93	Base Letter to Regulators Concerning FFA Schedule	Cole, John R, LtCol 93 BW/CVE	880 CD 3
26 May 93	HQ ACC Letter to EPA Concerning Dispute Resolution, ROD, Cost to Comply Summary, OU-2	Mogge, John W, Col HQ ACC/CEV	881 CD 3
27 May 93	EPA Letter to Base Concerning Work Plan, Revised Appendix B, SCOU	Work, Michael EPA Region IX	882 CD 3
28 May 93	CRWQCB Letter to EPA Concerning ROD Dispute Resolution, OU-2	Pearson, J Lawrence California Regional Water Quality Control Board	1764 CD 9

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Jun 93	RI/FS, Draft Final Comprehensive Basewide Work Plan, SAP, Vol II of II, Appendix B-1	Jacobs Engineering Group, Inc.	885 CD 5
Jun 93	RI/FS, Draft Final QAPP, Vol I of II	Jacobs Engineering Group, Inc.	886 CD 3
Jun 93	RI/FS, Draft Final Work Plan, SAP, SCOU	Jacobs Engineering Group, Inc.	887 CD 5
Jun 93	LTM Sampling Plan	Jacobs Engineering Group, Inc.	888 CD 5
Jun 93	Site HSP, Groundwater Remediation System Installation, OU-1	EA Engineering, Science, and Technology, Inc.	965 CD 4
01 Jun 93	EPA Letter to Base Concerning Protection of Wetlands During RI	Work, Michael EPA Region IX	889 CD 5
02 Jun 93	Final Closure Plan, Former PCB Storage Facility	Jonas & Associates, Inc.	1058 CD 4
03 Jun 93	Base Letter to Jacobs Concerning Disposition of Waste Generated, OU-2	Baker, Thomas R, LtCol 93 BW/CVE	890 CD 5
04 Jun 93	Work Plan Amendment, EE/CA for JP-4 Contaminated Soils, Western Flightline Sector, FS-1, FS-2	PRC Environmental Management, Inc.	891 CD 5
09 Jun 93	EPA Letter to Base, CDTSC, and CRWQCB Concerning Finalization of Draft Final Work Plan, SCOU	Work, Michael EPA Region IX	893 CD 5
09 Jun 93	RA, JP-4 Contaminated Soils Along Western Flightline Sector, Addendum to HSP, FS-1, FS-2	PRC Environmental Management, Inc.	895 CD 3

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11 Jun 93	HQ ACC Letter to EPA Concerning ROD, Dispute Resolution, OU-2	Burnet, Gilbert N HQ ACC/CEV	04 CD 2
15 Jun 93	HQ ACC Letter to EPA Concerning ROD, Dispute Resolution, OU-2	Mogge, John W, Col HQ ACC/CEV	30 CD 2
16 Jun 93	Base Letter to EPA Concerning Draft Final Work Plan, SCOU	Cole, John R, LtCol 93 BW/CVE	42 CD 2
17 Jun 93	Fact Sheet, Draft Basewide Cleanup Newsletter	93 BW/PA	67 CD 2
17 Jun 93	Base Letter to Regulators Concerning Proposed RPM Meeting Agenda, 29 Jun 93	Cole, John R, LtCol 93 BW/CVE	69 CD 2
21 Jun 93	EPA Letter to Base Concerning Comments on Revised Draft Final Work Plan, SCOU	Work, Michael EPA Region IX	214 CD 2
22 Jun 93	EPA Letter to HQ ACC, CDTSC, and CRWQCB Concerning ROD, Dispute Resolution, OU-2	Takata, Keith EPA Region IX	218 CD 2
22 Jun 93	Base Letter to CRWQCB Concerning Temporary Shut Down, DA-4	Baker, Thomas R, LtCol 93 CES/CEV	219 CD 2
23 Jun 93	EPA Letter to Base Concerning Sampling of GAC Groundwater Treatment Unit, DA-4	Dean, Steve M EPA Region IX	943 CD 3
28 Jun 93	RPM Meeting Minutes, 20 May 93	Baker, Thomas R, LtCol 93 CES/CEV	224 CD 2

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
29 Jun 93	CDTSC and CRWQCB Letter to Base Concerning Submittal of Individual Site FSP, SCOU	Izzo, Victor J Austreng, James C California Regional Water Quality Control Board California Department of Toxic Substances Control	249 CD 2
29 Jun 93	CDTSC Letter to EPA Concerning Extension of Review Period for dispute, OU-2	Wang, David California Department of Toxic Substances Control	258 CD 2
Jul 93	Draft Site Construction Quality Control Program, Pump and Treat System	EA Engineering, Science, and Technology, Inc.	966 CD 4
01 Jul 93	TRC Meeting Minutes, 09 Jun 93	Bishop, Raymond C, Col 93 BW/CVE	311 CD 2
12 Jul 93	EPA Letter to Base Concerning Comments on Technical Memorandum for Risk Assessment	Work, Michael EPA Region IX	341 CD 2
12 Jul 93	Right of Entry Agreement With Resident to Inspect Property for the Release of Hazardous Substances	Kotyk, Jack W AFBDA/OL-I	342 CD 2
12 Jul 93	HQ ACC Letter to EPA Concerning ROD, Dispute Resolution, Cost to Comply Summary, OU-2	Mogge, John W, Col HQ ACC/CEV	346 CD 2
13 Jul 93	Base Letter to CRWQCB Concerning Summary Sheet of All Monthly TCE Results	Baker, Thomas R, LtCol 93 CES/CEV	380 CD 3
16 Jul 93	Base Letter to Resident Concerning Their Culligan Water Filter	Baker, Thomas R, LtCol 93 CES/CEV	400 CD 3

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
18 Jul 93	RPM Meeting Agenda, 22 Jul 93	Cole, John R, LtCol 93 BW/CVE	413 CD 3
21 Jul 93	CRWQCB Letter to Base Concerning Comments on FSP, SCOU	Izzo, Victor J California Regional Water Quality Control Board	451 CD 3
30 Jul 93	Agreement With Resident for Right of Entry, Environmental Testing and Monitoring	93 CES/CEVR	457 CD 3
30 Jul 93	CDTSC Letter to Base Concerning Comments on RI, Draft Final Comprehensive Basewide Groundwater SAP	Austreng, James C California Department of Toxic Substances Control	463 CD 3
Aug 93	RI/FS, Draft Final Comprehensive Basewide Work Plan, SAP, Vol I of II	Jacobs Engineering Group, Inc.	962 CD 5
Aug 93	RI/FS, Draft Final Comprehensive Basewide Work Plan, SAP, Vol II of II	Jacobs Engineering Group, Inc.	963 CD 5
03 Aug 93	RPM Meeting Minutes, 22 Jul 93	Watkin, Geoff W Jacobs Engineering Group, Inc.	474 CD 3
06 Aug 93	CRWQCB Letter to HQ ACC Concerning Remaining Dispute Issues, OU-2	Pearson, J Lawrence California Regional Water Quality Control Board	484 CD 3
09 Aug 93	Base Letter to Resident Concerning Comments on Water Sample Results	Fraher, Jeffrey T, Maj 93 CES/CEV	494 CD 3
09 Aug 93	EPA Letter to CRWQCB Concerning ROD Dispute Issues, OU-2	Anderson, Julie EPA Region IX	504 CD 3

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09 Aug 93	CRWQCB Letter to Regulators and Base Concerning Phase II Groundwater Reinjection Standards, OT-29	Pearson, J Lawrence California Regional Water Quality Control Board	1199 CD 6
12 Aug 93	Base Letter to Regulators Concerning Waste Water Disposal	Baker, Thomas R, LtCol 93 CES/CEV	508 CD 3
12 Aug 93	CRWQCB Letter to Base Concerning Comments on FSP, SCOU	Izzo, Victor J California Regional Water Quality Control Board	525 CD 3
13 Aug 93	RPM Meeting Agenda, 19 Aug 93	Baker, Thomas R, LtCol 93 CES/CEV	527 CD 3
16 Aug 93	Base Letter to Regulators Concerning Waste Management Plan and Non-Source Waste Areas	Baker, Thomas R, LtCol 93 CES/CEV	528 CD 3
16 Aug 93	EPA Letter to Base Concerning Comments on Updated Long Term Groundwater Sampling Plan	Work, Michael EPA Region IX	533 CD 3
16 Aug 93	Bechtel Letter to Jacobs Concerning FSP Review	Haskins, Greg Bechtel Environmental, Inc.	536 CD 3
19 Aug 93	Dispute Resolution Meeting Minutes, OU-2, 10 Aug 93,	Vorster, Antonia K J California Regional Water Quality Control Board	540 CD 3
23 Aug 93	CRWQCB Letter to Base Concerning FSP Addendum	Izzo, Victor J California Regional Water Quality Control Board	563 CD 3
23 Aug 93	SOW, RI/FS, SCOU and CBOU	AFCEE/ESB	945 CD 3

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24 Aug 93	CRWQCB Letter to Base Concerning Comments on FSP, SCOU	Izzo, Victor J California Regional Water Quality Control Board	575 CD 4
25 Aug 93	RPM Meeting Agenda, 08 Sep 93	Fraher, Jeffrey T, Maj 93 BW/CVE	579 CD 4
25 Aug 93	EPA Letter to CRWQCB Concerning Comments on Draft Meeting Minutes, 10 Aug 93, OU-2	Work, Michael EPA Region IX	581 CD 4
27 Aug 93	TAC Meeting Announcement, 01 Sep 93	Bain, Diane CH2M Hill	625 CD 3
27 Aug 93	CRWQCB Letter to HQ ACC, CDHS, and EPA Concerning Resolution of Dispute, OU-2	Pearson, J Lawrence California Regional Water Quality Control Board	654 CD 3
31 Aug 93	RPM Draft Meeting Minutes, 19 Aug 93	Watkin, Geoff W Jacobs Engineering Group, Inc.	655 CD 3
Sep 93	EPA Superfund Technical Assistance Grants	HQ USEPA	238 CD 2
Sep 93	Advance Draft Hydrogeological Technical Memorandum Report, OU-2	Jacobs Engineering Group, Inc.	668 CD 3
01 Sep 93	TRC Meeting Agenda, 08 Sep 93	Parker, Scarlette P, TSgt 93 BW/PA	711 CD 3
01 Sep 93	EPA Letter to CRWQCB Concerning Comments on Draft Meeting Minutes, 10 Aug 93 and Draft Waste Discharge Requirement, OU-2	Work, Michael EPA Region IX	738 CD 3

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02 Sep 93	CRWQCB Letter to Base Concerning FSP Addendum	Izzo, Victor J California Regional Water Quality Control Board	132 CD 2
02 Sep 93	CRWQCB Letter to Base Concerning Comments on FSP, SCOU	Izzo, Victor J California Regional Water Quality Control Board	800 CD 3
02 Sep 93	CRWQCB Letter to Base Concerning Comments on FSP, SCOU	Izzo, Victor J California Regional Water Quality Control Board	837 CD 3
02 Sep 93	EPA Letter to HQ ACC, CDTSC, and CRWQCB Concerning Comments on Dispute Resolution, ROD, OU-2	Takata, Keith EPA Region IX	849 CD 3
03 Sep 93	HQ ACC Letter to CDTSC and CRWQCB Concerning ROD, Dispute Resolution, OU-2	Burnet, Gilbert N HQ ACC/CEV	183 CD 2
08 Sep 93	RPM Meeting Minutes, 19 Aug 93	Fraher, Jeffrey T, Maj 93 BW/CVE	233 CD 2
14 Sep 93	Base Letter to Regulators Concerning Rinsing of Groundskeeper Equipment on Soil	Chan, Arthur D 93 BW/CVE	298 CD 2
14 Sep 93	Situs Investments Letter to Base Concerning Permission to Enter for Testing Parcels of Land	Smith, Frederick W, Jr Situs Investments, Inc.	333 CD 2
15 Sep 93	Base Letter to Resident Concerning Well Sampling Information	Morris, Brett, Capt 93 BW/CVE	758 CD 3
16 Sep 93	CRWQCB Letter to Base Concerning LTM Sampling Plan, Jun 93	Izzo, Victor J California Regional Water Quality Control Board	741 CD 3

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17 Sep 93	Base Letter to Regulators Concerning Proposed Agenda for RPM Meeting, 14 Oct 93	Cole, John R, LtCol 93 BW/CVE	824 CD 3
20 Sep 93	EPA Letter to Base Concerning ROD, Revised Draft Final, OU-2	Work, Michael EPA Region IX	831 CD 3
22 Sep 93	EPA Letter to Base Concerning Delayed Draft Preliminary Conceptual Design Document, OU-2	Work, Michael EPA Region IX	725 CD 3
22 Sep 93	CRWQCB Letter to Base Concerning Finalizing Waste Management Plan	Izzo, Victor J California Regional Water Quality Control Board	766 CD 4
22 Sep 93	HQ ACC Letter to Base Concerning ROD, Revised Draft Final, OU-2	Battaglia, Michael R HQ ACC/CEVR	780 CD 3
22 Sep 93	EA Letter to HSC Concerning Comments on Requested Modeling of Groundwater Flow and Contaminant Dispersion, OU-1	Bugica, David M EA Engineering, Science, and Technology, Inc.	953 CD 3
24 Sep 93	HQ ACC Letter to Regulators Concerning Dispute Resolution, Draft Final ROD Submission, OU-2	Burnet, Gilbert N HQ ACC/CEV	677 CD 3
12 Oct 93	RPM Meeting Minutes, 08 Sep 93	Chan, Arthur D 93 BW/CVE	220 CD 2
15 Oct 93	CDTSC Letter to Base Concerning Interfacing of RCRA Units With CERCLA Activities	Pappas, James M California Department of Toxic Substances Control	229 CD 2
19 Oct 93	Management Action Plan (MAP)	Earth Technology Corp.	237 CD 2

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22 Oct 93	EPA Letter to Base Concerning Draft Test Study for Millipurge Method for 4th Quarter Groundwater Sampling	Work, Michael EPA Region IX	262 CD 2
22 Oct 93	EPA Letter to Base Concerning Comments on ROD, Revised Draft Final, OU-2	Work, Michael EPA Region IX	271 CD 2
22 Oct 93	CDTSC Letter to Base Concerning Request for Assistance in Planning for Implementation of RAB	Wang, David California Department of Toxic Substances Control	956 CD 3
27 Oct 93	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on ROD, Revised Draft Final, OU-2	Ward, Daniel T California Department of Toxic Substances Control	562 CD 3
27 Oct 93	EPA Letter to Base Concerning Ecological Risk Assessment Outline	Work, Michael EPA Region IX	883 CD 3
28 Oct 93	EPA Letter to Base Concerning Draft, Characterization Technical Memorandum Vol I, Fuel Spill No. 1 and 2	Work, Michael EPA Region IX	892 CD 5
Nov 93	ROD, Final, OU-2	93 CES/CEVR	206 CD 2
Nov 93	Hydrogeological Technical Memorandum Report, Raw Field Data, OU-2	Jacobs Engineering Group, Inc.	968 CD 4
03 Nov 93	Base Letter to EPA Concerning Request for Extension on Start Up Date, OU-1	Baker, Thomas R, LtCol 93 BW/CVE	746 CD 3
04 Nov 93	EPA Letter to Base Concerning Comparison of SCOU Sites List and FSP	Work, Michael EPA Region IX	291 CD 2

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08 Nov 93	EPA Letter to Base Concerning Comments on ROD, Revised Draft Final, OU-2	Work, Michael EPA Region IX	181 CD 2
10 Nov 93	Base Letter to Regulators Concerning Requested Update Pages, Final ROD, OU-2	Cole, John R, LtCol 93 BW/CVE	184 CD 2
12 Nov 93	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Hydrogeologic Technical Memorandum, OU-2	Ward, Daniel T California Department of Toxic Substances Control	185 CD 2
15 Nov 93	EPA Letter to Base Concerning Comments on Draft Hydrogeological Technical Memorandum, OU-2	Work, Michael EPA Region IX	99 CD 2
15 Nov 93	Finalized Boring Logs, Revised Appendix A, OU-2	Jacobs Engineering Group, Inc.	969 CD 4
18 Nov 93	Action Memorandum, Closure of Former PCB Storage Facility and Recoverable JP-4 Tanks	93 BW/CVE	100 CD 2
19 Nov 93	Technical Memorandum Report, Site Characterization, Addendum, Performance of Bench Scale Treatability Study, JP-4 Contaminated Soils	PRC Environmental Management, Inc.	80 CD 2
19 Nov 93	EPA Letter to Base Concerning Draft Preliminary Conceptual Design, OU-2	Work, Michael EPA Region IX	101 CD 2
22 Nov 93	SOW, RI/FS, Comprehensive Basewide Program, and LTM Program, SCOU	93 CES/CEVR	970 CD 4
26 Nov 93	SOW, RI/FS, Comprehensive Basewide Program, and LTM Program, SCOU	93 CES/CEVR	972 CD 4

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Dec 93	Base Letter to Regulators Concerning Proposed RPM Meeting Agenda, 02 Dec 93	Cole, John R, LtCol 93 BW/CVE	79 CD 2
Dec 93	SOW, ATSDR Ecological Risk Assessment	AFCEE/ESB	921 CD 3
08 Dec 93	Basewide Environmental Baseline Survey (EBS), OU-1, OU-2, SCOU	The Earth Technology Corp.	1765 CD 9
13 Dec 93	AFBCA Letter to EPA Concerning Request for Concurrence of On-Base Uncontaminated Property Determination	Olsen, Alan K AFBCA/DR	925 CD 3
14 Dec 93	Base Letter to CDHS, CRWQCB, and Jacobs Concerning Monthly TCE Results	Chan, Arthur D 93 BW/CV	1024 CD 4
16 Dec 93	EPA Letter to Base Concerning Comments on Draft Basewide Management Plan	Roberts, David E EPA Region IX	919 CD 3
Jan 94	Final Hydrogeological Technical Memorandum Report, Vol I of II, OT-30, SD-12	Jacobs Engineering Group, Inc.	764 CD 3
Jan 94	Final Hydrogeological Technical Memorandum Report, Vol II of II, OT-30, SD-12	Jacobs Engineering Group, Inc.	765 CD 4
Jan 94	Basewide Ecological Risk Assessment, Preliminary Draft Work Plan	Jacobs Engineering Group, Inc.	944 CD 3
Jan 94	LTM Sampling Plan Update	Jacobs Engineering Group, Inc.	974 CD 5

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05 Jan 94	Conversation Confirmer Teleconference Minutes, Upper Subshallow HSZ Data Gaps, OU-2	Heller, Noah R Jacobs Engineering Group, Inc.	932 CD 3
05 Jan 94	RPM Meeting Minutes, 09 Dec 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	951 CD 3
06 Jan 94	Base Letter to CRWQCB Concerning RA, Breaking Through Second GAC Unit, DA-4	Fraher, Jeffrey T, Maj 93 CES/CC	941 CD 3
12 Jan 94	TRC Meeting Minutes, 08 Dec 93	93 BW/CV	1025 CD 4
21 Jan 94	RPM Meeting Minutes, Dec 93	Cole, John R, LtCol 93 BW/CVE	1026 CD 4
04 Feb 94	EPA Letter to HQ USEPA Concerning Accuracy of Some Information Presented by Defense Environmental Response Task Force	Kemmerer, John R EPA Region IX	915 CD 3
08 Feb 94	RPM Meeting Minutes, 27 Jan 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	950 CD 3
11 Feb 94	Technical Memorandum Report, Site Characterization, FS-1	PRC Environmental Management, Inc.	976 CD 4
11 Feb 94	Technical Memorandum Report, Site Characterization, FS-2	PRC Environmental Management, Inc.	977 CD 4
18 Feb 94	MDPH Letter to Base Concerning Review of Basewide EBS	Palsgaard, Jeff H Merced County Department of Public Health	1507 CD 6
28 Feb 94	RPM Meeting Agenda, 02 Mar 94	Salgado, Rogelio R 93 CES/CEV	1027 CD 4

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Mar 94	RAB Meeting Proposed Agenda, 09 Mar 94	Bishop, Raymond C, Col 93 BW/CV	957 CD 3
Mar 94	Phase II, Draft Risk Assessment Technical Memorandum Report, SCOU	Jacobs Engineering Group, Inc.	978 CD 4
02 Mar 94	Final RPM Meeting Minutes, 27 Jan 94	Salgado, Rogelio R 93 BW/CVE	926 CD 3
07 Mar 94	Fact Sheet, Base Environmental Update, 07 Mar 94	93 BW/PA	984 CD 4
09 Mar 94	Newspaper Article, "Advisory Board Meets"	The Merced Sun Star	985 CD 4
14 Mar 94	EPA Letter to Base Concerning Comments on LTM Sampling Plan	Roberts, David E EPA Region IX	1201 CD 6
16 Mar 94	CRWQCB Letter to CDTSC Concerning RPM Meeting Notes, 02 Mar 94	Izzo, Victor J California Regional Water Quality Control Board	1028 CD 4
21 Mar 94	RPM Meeting Minutes, 02 Mar 94	Cole, John R, LtCol 93 BW/CVE	1029 CD 4
22 Mar 94	SOW, Title I Services for Groundwater Treatment, OU-2 and Title II Services for Groundwater Treatment, OU-1	Jacobs Engineering Group, Inc.	947 CD 3
25 Mar 94	Investigative Derived Waste Disposition Data	93 CES/CEVR	1030 CD 4
29 Mar 94	EPA Letter to Base Concerning Millipurge Test Study	Roberts, David E EPA Region IX	1202 CD 6

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30 Mar 94	EPA Letter to Jacobs Concerning Comments on Ecological Risk Assessment Samples	Roberts, David E EPA Region IX	1031 CD 4
Apr 94	BRAC Cleanup Plan (BCP)	The Earth Technology Corp.	981 CD 4
Apr 94	EE/CA, Draft Final, JP-4 Removal from Vadose Zone, FS-1, FS-2	PRC Environmental Management, Inc.	982 CD 4
01 Apr 94	RAB Meeting Minutes, 09 Mar 94	Bishop, Raymond C, Col 93 BW/CV	1032 CD 4
06 Apr 94	RPM Meeting Minutes, 24 Mar 94	Jacobs Engineering Group, Inc.	949 CD 3
15 Apr 94	AFBCA Letter to Distribution Concerning Invitation to DoD RAB Workshop	Olsen, Alan K AFBCA/DR	922 CD 3
18 Apr 94	Comprehensive Basewide Mud Rotary Drilling Program Modification Report	Jacobs Engineering Group, Inc.	933 CD 3
18 Apr 94	CDTSC Letter to EPA Concerning Review of EBS	Wang, David California Department of Toxic Substances Control	952 CD 3
19 Apr 94	Base Letter to Regulators Concerning RPM Meeting Minutes, 24 Mar 94	Cole, John R, LtCol 93 BW/CVE	954 CD 3
19 Apr 94	Press Release, EPA Announces Identification of Uncontaminated Property Available for Reuse	Chan, Arthur D 93 BMW/CVE	973 CD 4
20 Apr 94	RAB Revised Charter, 20 Apr 94	Bishop, Raymond C, Col 93 BW/CV	1033 CD 4

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26 Apr 94	Base Letter to CRWQCB Concerning Notification of RA Taken Off Line, OT-30	Chan, Arthur D 93 CES/CE	1203 CD 6
28 Apr 94	AFBCA Letter to EPA Concerning Comments on ROD Signature Page, OU-2	Carr, John P AFBCA/NW	929 CD 3
28 Apr 94	Action Items for SCOU RI from RPM Meeting Minutes, 13 Apr 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	939 CD 3
28 Apr 94	RAB Executive Meeting Minutes, 22 Apr 94	Bishop, Raymond C, Col 93 BW/CV	1034 CD 4
28 Apr 94	EPA Letter to Base Concerning Interim RA, Extraction Well SE-7, 95% Design Review, OU-2	Roberts, David E EPA Region IX	1035 CD 4
28 Apr 94	EPA Letter to Base Concerning Request for Extension of FFA Schedule, RI/FS, SCOU	Roberts, David E EPA Region IX	1210 CD 6
29 Apr 94	Conceptual Design Report, Vol I of II, OU-2	Jacobs Engineering Group, Inc.	979 CD 4
29 Apr 94	Conceptual Design Report, Outline Specification, Vol II of II, OU-2	Jacobs Engineering Group, Inc.	980 CD 4
02 May 94	EPA Letter to Base Concerning Draft Final Basewide Waste Management Plan	Roberts, David E EPA Region IX	918 CD 3
05 May 94	Background Data and Information, SCOU	Jacobs Engineering Group, Inc.	924 CD 3
06 May 94	CDTSC Letter to Base Concerning Approval to Proceed With Dismantling of Surface Features, Two RCRA Sites	Austreng, James C California Department of Toxic Substances Control	1036 CD 4

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06 May 94	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on LTM Sampling Plan, Draft Final Waste Management Plan, Draft VLEACH Benzene Results, and Construction of TCE Extraction Well	Austreng, James C California Department of Toxic Substances Control	1037 CD 4
09 May 94	Jacobs Letter to AFCEE/ESR Concerning Response to EPA Comments on Draft Conceptual Design Report, Groundwater Treatment, OU-2	Leach, James D Jacobs Engineering Group, Inc.	928 CD 3
10 May 94	RPM Draft Meeting Minutes, 28 Apr 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	927 CD 3
11 May 94	EPA Letter to AFBCA Concerning Review of Proposal to Lease Bldgs 1862 and 1863	Roberts, David E EPA Region IX	917 CD 3
13 May 94	Final Basewide Waste Management Plan	IT Corp.	912 CD 3
17 May 94	CRWQCB Letter to CDTSC Concerning Comments on Draft O&M Manual, OU-1	Izzo, Victor J California Regional Water Quality Control Board	920 CD 3
17 May 94	EE/CA, Final, FS-1, FS-2	PRC Environmental Management, Inc.	988 CD 4
17 May 94	Technical Memorandum Report, Final Site Characterization, FS-1	PRC Environmental Management, Inc.	989 CD 4
17 May 94	Technical Memorandum Report, Final Site Characterization, FS-2	PRC Environmental Management, Inc.	990 CD 4
20 May 94	RPM Meeting Minutes, 28 Apr 94	Cole, John R, LtCol 93 BW/CVE	1038 CD 4

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23 May 94	Newspaper Article, "Notice of Public Comment Period on Projected Construction of a TCE Extraction Well Behind Bldg 1200"	The Merced Sun Star	1039 CD 4
23 May 94	Newspaper Article, "Notice of Public Comment Period on the EE/CA Report on Jet Fuel (JP-4) Removal From Fuel Spill Sites 1 and 2"	The Merced Sun Star	1040 CD 4
26 May 94	Base Letter to Regulators Concerning Documentation of Meetings With Local Property Owners Impacted by Environmental Cleanup Efforts	Gaddy, Armon T, Jr, TSgt 93 BW/PA	923 CD 3
26 May 94	RPM Meeting Minutes, 26 May 94	93 CES/CEVR	1215 CD 6
Jun 94	Phase II, Risk Assessment, Technical Memorandum Report, CBOU	Jacobs Engineering Group, Inc.	931 CD 3
Jun 94	LTM Sampling Program, Draft Summary of Groundwater Monitoring Report, 2nd Quarter 94	Jacobs Engineering Group, Inc.	991 CD 4
Jun 94	Jacobs Response to EPA and CRWQCB Comments on Draft Final Conceptual Design Report, OU-2	Jacobs Engineering Group, Inc.	1041 CD 4
01 Jun 94	Fact Sheet, Base Environmental Update, 01 Jun 94	93 BW/PA	971 CD 4
09 Jun 94	CRWQCB Letter to CDTSC Concerning Inadequacy of Preliminary RI/FS, Draft Report, SCOU	Izzo, Victor J California Regional Water Quality Control Board	934 CD 3

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09 Jun 94	RPM Draft Meeting Minutes, 26 May 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	948 CD 3
13 Jun 94	AFBCA and ATSDR Meeting Minutes for Health Consultations and Data Gap Reviews, 5-6 May 94	Stokes, Mark H, Col AFBCA-AL/OEM	1042 CD 4
14 Jun 94	Jacobs Letter to AFCEE Concerning Response to EPA and CRWQCB Comments on LTM Sampling Plan	Watkin, Geoff W Jacobs Engineering Group, Inc.	896 CD 3
14 Jun 94	RAB Meeting Minutes, 14 Jun 94	Mollison, John C Jr, Col 93 CES/CC	1217 CD 6
15 Jun 94	RA, Work Plan, OU-2	Jacobs Engineering Group, Inc.	897 CD 3
16 Jun 94	EPA Letter to Base Concerning Inadequacy of RI/FS, Draft Report, SCOU	Roberts, David E EPA Region IX	916 CD 3
17 Jun 94	EPA Letter to Base Concerning Selection of Service Center to Administer RD/RA Contract, OU-2	Roberts, David E EPA Region IX	930 CD 3
17 Jun 94	CDTSC Draft Memorandum Concerning Initial Review of RI/FS, Draft Report, SCOU	Scruggs, Mary California Department of Toxic Substances Control	938 CD 3
18 Jun 94	Jacobs Letter to AFCEE Concerning Quality of RI/FS, Draft Report, SCOU	Jacobs Engineering Group, Inc.	913 CD 3
23 Jun 94	Jacobs Response to Data Quality Concerning RI/FS, Report, SCOU	Jacobs Engineering Group, Inc.	940 CD 3

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23 Jun 94	SOW, Full Scale Treatability Study, Fuel Spill Sites I and II	AFCEE/ESB	1043 CD 4
27 Jun 94	TWG Meeting Action Items, 23 Jun 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	936 CD 3
28 Jun 94	Maps and Figures, SCOU	93 CES/CEVR	914 CD 3
30 Jun 94	TWG Meeting Action Items, 28 Jun 94	Watkin, Geoff W Jacobs Engineering Group, Inc.	937 CD 3
07 Jul 94	Dioxin/Furan Analysis, Landfill 1	Jacobs Engineering Group, Inc.	955 CD 3
20 Jul 94	Base Letter to CDTSC and EPA Concerning Request for Extension on FFA Schedule	Cole, John R, LtCol 93 BW/CVE	1216 CD 6
20 Jul 94	Final Specification for Petroleum Storage Tank Removal	HQ ACC/CES	1293 CD 6
29 Jul 94	Groundwater Pump and Treat System Operational Data, OU-1	EA Engineering, Science, and Technology, Inc.	992 CD 4
03 Aug 94	HQ ACC Letter to EPA Concerning Assessment of Stipulated Penalties, OU-1	Scarborough, Ramsey T HQ ACC/CEVR	993 CD 4
03 Aug 94	EPA Letter to AFCEE Concerning Comments on SOW, OU-2, SS-17, SS-18	Roberts, David E EPA Region IX	1045 CD 4
10 Aug 94	EPA Letter to Base Concerning Violation of FFA and Monitoring and Reporting Requirements, OU-1	Anderson, Julie EPA Region IX	994 CD 4

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16 Aug 94	HQ ACC Letter to EPA Concerning Comments on Violation of FFA, Monitoring and Reporting Requirements, OT-29	Madrid, Marcos J, Col HQ ACC/CEV	1218 CD 6
19 Aug 94	Technical Memorandum Report, TCE Biodegradation Bench Scale Study	Montgomery Watson	995 CD 4
19 Aug 94	TCE Biodegradation Bench Scale Study, Final Report, Appendix A, Evaluation of Bioremediation for TCE Contaminated Soils	Montgomery Watson	996 CD 4
25 Aug 94	Summary of Modeling Recommendations and Anticipated Actions Report, SD-012, OT-030	Utah State University	997 CD 4
Sep 94	Report of First Month Operation, Groundwater Pump and Treat, OU-1	EA Engineering, Science, and Technology, Inc.	998 CD 4
Sep 94	Fact Sheet, Enviro Progress Newsletter, Edition 1	93 BW/PA	999 CD 4
Sep 94	Fact Sheet, Enviro Progress Newsletter, Edition 1	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1066 CD 4
29 Sep 94	CDTSC Letter to Base Concerning Review of RI/FS, Draft Report, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1001 CD 4
30 Sep 94	EPA Letter to Base Concerning Review of RI/FS, Draft Report, SCOU	Roberts, David E EPA Region IX	1002 CD 4
04 Oct 94	Peer Review Meeting Summary	Sayger, Susan Resources Applications, Inc.	1004 CD 4

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06 Oct 94	TWG Meeting Minutes, 5-6 Oct 94	Jacobs Engineering Group, Inc.	1005 CD 4
06 Oct 94	RPM Meeting Minutes, 22 Sep 94	Hicks, Brad 93 CES/CEVR	1006 CD 4
17 Oct 94	EPA Letter to Base Concerning Additional Comments on RI/FS, Draft Report, SCOU	Roberts, David E EPA Region IX	1008 CD 4
21 Oct 94	CDTSC Letter to Base Concerning Comments on CRP	Schumacher, Nathan California Department of Toxic Substances Control	1009 CD 4
21 Oct 94	Public Health Assessment Data Gap Study	AL/OEM	1432 CD 6
25 Oct 94	EPA Letter to Base Concerning Review of Preliminary Draft Explanation of Significance Difference for ROD, OU-2	Roberts, David E EPA Region IX	1010 CD 4
27 Oct 94	RAB Meeting Minutes, 13 Sep 94	Mollison, John C, Jr, Col 93 SPTG/CC	1011 CD 4
28 Oct 94	SOW, O&M and Monitoring, OU-1	93 CES/CEVR	1046 CD 4
28 Oct 94	Final Dioxin/Furan Report and Data Summary, Vol I of VII	Quanterra Environmental Services, Inc.	1078 CD 4
28 Oct 94	Final Dioxin/Furan Report, Isomer Specific Initial Calibration Data, Vol II of VII	Quanterra Environmental Services, Inc.	1079 CD 4
28 Oct 94	Final Dioxin/Furan Report, Isomer Specific Continuing Calibration Data, Vol III of VII	Quanterra Environmental Services, Inc.	1080 CD 4

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28 Oct 94	Final Dioxin/Furan Report, Total Dioxin/Furan Initial Calibration Data, Vol IV of VII	Quanterra Environmental Services, Inc.	1081 CD 4
28 Oct 94	Final Dioxin/Furan Report, Total Dioxin/Furan Continuing Calibration Data, Vol V of VII	Quanterra Environmental Services, Inc.	1082 CD 4
28 Oct 94	Final Dioxin/Furan Report, Isomer Specific Data, Vol VI of VII	Quanterra Environmental Services, Inc.	1083 CD 4
28 Oct 94	Final Dioxin/Furan Report, Total Dioxin/Furan Data, Vol VIIA of VII	Quanterra Environmental Services, Inc.	1084 CD 4
28 Oct 94	Final Dioxin/Furan Report, Total Dioxin/Furan Data, Vol VIIB of VII	Quanterra Environmental Services, Inc.	1085 CD 4
31 Oct 94	SOW, LTM Program and Millipurge Study	AFCEE/ESB	1044 CD 4
Nov 94	Fact Sheet, Enviro Progress Newsletter, Edition 2	93 BW/PA	1013 CD 4
Nov 94	Final Report First Quarter of Operation, Groundwater Pump and Treat, OU-1	EA Engineering, Science, and Technology, Inc.	1060 CD 4
Nov 94	Fact Sheet, Enviro Progress Newsletter, Edition 2	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1067 CD 4
Nov 94	Final EIS, Disposal and Reuse	AFBDA/OL-J	2081 CD 11
01 Nov 94	CRWQCB Letter to Base Concerning Violation of Waste Discharge Requirements	Vorster, Antonia K J California Regional Water Quality Control Board	1209 CD 6

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10 Nov 94	Jacobs Letter to AFCEE/ESR Concerning Response to CDTSC Comments on RI/FS, Revised Draft Report, SCOU	Watkin, Geoff W Jacobs Engineering Group, Inc.	1228 CD 6
11 Nov 94	LTM Sampling Program, Summary of Groundwater Monitoring Report, 3rd Quarter, 94	Jacobs Engineering Group, Inc.	1012 CD 4
28 Nov 94	RPM Meeting Minutes, 02 Nov 94	Polhmeier, Mark A, Capt 93 BW/CEV	1014 CD 4
28 Nov 94	CDTSC Letter to Base Concerning Comments on Draft Treatability Study, SS-17, SS-18	Ghazi, Rizgar A California Department of Toxic Substances Control	1230 CD 6
29 Nov 94	CDTSC Letter to AFCEE Concerning CRWQCB Comments on SOW, Draft LTM Sampling Program, OT-29	Ghazi, Rizgar A California Department of Toxic Substances Control	1231 CD 6
Dec 94	Community Relations Plan (CRP)	Gutierrez - Palmenberg, Inc.	1015 CD 4
Dec 94	Environmental Remediation QPP	Jacobs Engineering Group, Inc.	1174 CD 6
02 Dec 94	EPA Letter to Base Concerning Response to Comments on RI/FS, Draft Report, SCOU	Roberts, David E EPA Region IX	1232 CD 6
05 Dec 94	AFCEE Letter to Jacobs Concerning Comments on RI/FS, Draft Comprehensive Basewide Report	Hobbins, Christopher D AFCEE/ERB	1212 CD 6
07 Dec 94	RI/FS, ROD, Final Draft Explanation of Significant Difference, OU-2	93 CES/CEVR EPA Region IX California Department of Toxic Substances Control	1063 CD 4

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14 Dec 94	GEMS Letter to Brown and Root Concerning Closure of Former PCB Storage Facility, Bldg 1203	Camacho, Richard Ogamba, Briggs General Environmental Management Services	1057 CD 4
15 Dec 94	EPA Letter to Base Concerning Comments on RI/FS, Comprehensive Basewide Draft Report	Roberts, David E EPA Region IX	1016 CD 4
15 Dec 94	CDTSC Letter to Base Concerning Review of RI/FS, Draft Comprehensive Basewide Report	Ghazi, Rizgar A California Department of Toxic Substances Control	1017 CD 4
Jan 95	LTM Sampling Plan	Jacobs Engineering Group, Inc.	1124 CD 5
Jan 95	Newspaper Article, "Groundwater Cleanup to Cost $12 Million"	Hartsoe, Steve The Atwater Signal	1233 CD 6
10 Jan 95	Newspaper Article, "Announcement of ESD for Change to Granular Activated Carbon for Treatment of Contaminated Groundwater"	The Merced Sun Star	1235 CD 6
10 Jan 95	EPA and CDTSC Letter to Base Concerning FFA Violation of Failure to Perform Required Monitoring and Reporting, OT-29	Ghazi, Rizgar A Roberts, David E California Department of Toxic Substances Control EPA Region IX	1236 CD 6
12 Jan 95	EPA Letter to Base Concerning Responses to Comments on RI/FS, Draft Report, SCOU	Roberts, David E EPA Region IX	1238 CD 6
17 Jan 95	Newspaper Article, "TCE Cleanup Long and Costly Process"	Hartsoe, Steve The Merced Sun Star	1240 CD 6

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24 Jan 95	Conceptual Site Model Figures	Metcalf and Eddy, Inc.	1373 CD 6
27 Jan 95	EPA Letter to Base Concerning Comments on RI/FS Prototype Site, SS-82	Roberts, David E EPA Region IX	1241 CD 6
Feb 95	Phase I, Installation Test Letter Report, SS-17, SS-18	Jacobs Engineering Group, Inc.	1107 CD 5
07 Feb 95	CDTSC Letter to Base Concerning Proposed Screening Process for Vadose Zone Source Area, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1242 CD 6
14 Feb 95	Jacobs Letter to AFCEE Concerning Response to Comments on Millipurge Test Study and Decontamination of Pneumatic Pumps	McLeod, Campbell Jacobs Engineering Group, Inc.	1251 CD 6
17 Feb 95	RAB Meeting Minutes, 10 Jan 95	Mollison, John C Jr, Col AFBCA/OL-I	1254 CD 6
22 Feb 95	Draft Sampling and Analysis Report for Chlorinated Dibenz Dioxins in Wastewater and Sediments	LABAT-ANDERSON INCORPORATED	1093 CD 4
Mar 95	Fact Sheet, Enviro Progress Newsletter, Edition 4	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1089 CD 4
Mar 95	Final Report, 2nd Quarter of Operation, OU-1	EA Engineering, Science, and Technology, Inc.	1096 CD 4
Mar 95	Fact Sheet, Enviro Fact Sheet, Mar 95	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1256 CD 6

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02 Mar 95	Site Characterization Report, Airport Surveillance Radar Facility	Research Management Consultants, Inc.	1349 CD 6
03 Mar 95	Initial Air Monitoring and Risk Assessment Study, Airport Surveillance Radar Facility	Research Management Consultants, Inc.	1095 CD 4
08 Mar 95	EPA and CDTSC Letter to Base Concerning Request for Removal of Vapor Phase Carbon and Steam Regeneration Features, OU-1	Roberts, David E Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1092 CD 4
09 Mar 95	EPA and CDTSC Letter to Base Concerning RI/FS, Draft Final Report, SCOU	Ghazi, Rizgar A Roberts, David E California Department of Toxic Substances Control EPA Region IX	1263 CD 6
14 Mar 95	RAB Meeting Minutes, 14 Mar 95	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1091 CD 4
15 Mar 95	RPM Meeting Minutes, 15 Mar 95	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1090 CD 4
17 Mar 95	AFCEE Letter to Base Concerning Responses to Agency Comments on RI/FS, Comprehensive Basewide Report	Hobbins, Christopher D AFCEE/ERB	1094 CD 4
27 Mar 95	CDTSC Memorandum Concerning Low Purge Rate Monitoring Well Sampling	Vest, Mark California Department of Toxic Substances Control	1266 CD 6
28 Mar 95	CRWQCB Letter to CDTSC Concerning CERCLA Petroleum Exclusion, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1270 CD 6

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30 Mar 95	Armstrong Lab Letter to Base Concerning Survey Summary, Weapons Storage Area	Montgomery, James D, Jr, LtCol Armstrong Laboratory	1088 CD 4
31 Mar 95	Ecological Risk Assessment Study, Site Recommendations for No Further Ecological Investigation	Jacobs Engineering Group, Inc.	1086 CD 4
31 Mar 95	CDTSC Letter to Base Concerning Review of LTM Sampling Plan Draft Millipurge Test Study Work Plan	Ghazi, Rizgar A California Department of Toxic Substances Control	1273 CD 6
Apr 95	Summary of Groundwater Monitoring Report, 1st Quarter, OT-29, OT-30	Jacobs Engineering Group, Inc.	1125 CD 5
03 Apr 95	EPA Letter to Base Concerning Comments on Millipurge Test Study	Roberts, David E EPA Region IX	1274 CD 6
11 Apr 95	LTM Program, Summary of Domestic Well Sampling Results, Feb 95	Jacobs Engineering Group, Inc.	1102 CD 5
11 Apr 95	Summary of Domestic Well Sampling Results, Mar 95	Jacobs Engineering Group, Inc.	1103 CD 5
11 Apr 95	Base Letter to CDTSC and EPA Concerning Completion Plan for RI/FS, SCOU	Mollison, John C Jr, Col AFBCA/OL-I	1277 CD 6
14 Apr 95	EPA Letter to Base Concerning Comments on RI/FS, Draft Final Report, SCOU	Roberts, David E EPA Region IX	1100 CD 5
19 Apr 95	Base Letter to Distribution Concerning Response to EPA Comments on Millipurge Study Work Plan	Hobbins, Christopher D AFCEE/ERB	1278 CD 6
26 Apr 95	TWG Meeting Minutes, 24-26 Apr 95	AFBCA/OL-I	1099 CD 5

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28 Apr 95	Base Letter to EPA and CDTSC Concerning RPM Agreement on Resolving Issues, RI/FS, SCOU	Mollison, John C, Jr, Col AFBCA/OL-I	1097 CD 4
May 95	Technical Memorandum Report, Performance Evaluation Pump and Treat System, OU-1	EA Engineering, Science, and Technology, Inc.	1068 CD 4
May 95	Environmental Baseline Survey (EBS), Twenty-Five Parcels of Land	Geo-Marine, Inc.	1069 CD 4
May 95	Fact Sheet, Enviro Progress Newsletter, Edition 5	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1077 CD 4
May 95	Final QPP, Groundwater Treatment System, Vol I of II, OU-2	Jacobs Engineering Group, Inc.	1156 CD 5
May 95	Final QPP, Groundwater Treatment System, Vol II of II, OU-2	Jacobs Engineering Group, Inc.	1160 CD 5
May 95	Final Environmental Cleanup Plan, Groundwater Treatment System, OU-2	Jacobs Engineering Group, Inc.	1162 CD 5
10 May 95	CDHS Letter to CDTSC Concerning Base Landfills, RI/FS, SCOU	Palsgaard, Jeff H California Department of Health Services	1279 CD 6
11 May 95	EPA Letter to AFCEE Concerning SOW, RA, FT-01, SS-21, DP-115, SD-12	Roberts, David E EPA Region IX	1292 CD 6
12 May 95	HQ ACC Letter to Base Concerning Landfill-1 Issue	Battaglia, Michael R. HQ ACC CES/ESV	1070 CD 4

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17 May 95	EPA and CDTSC Letter to Base Concerning Comments on RI/FS, Draft Final Report, SCOU	Baker, Gregory Ward, Daniel T EPA Region IX California Department of Toxic Substances Control	1101 CD 5
24 May 95	Agreement From Technical Working Group Session Further Delineating Contents of RI/FS, 24 May 95, CB, SCOU	Hicks, Brad Roberts, David E Ghazi, Rizgar A Izzo, Victor J AFBCA/OL-I EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	1073 CD 4
Jun 95	Fact Sheet, Enviro Fact Sheet, Edition 2	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1104 CD 5
Jun 95	Fact Sheet, Enviro Fact Sheet, Edition 3	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1105 CD 5
Jun 95	Draft Report, 3rd Quarter of Operation, Groundwater Pump and Treat, OU-1	Jacobs Engineering Group, Inc.	1110 CD 5
01 Jun 95	CDTSC Letter to Base Concerning Comments on Ecological Risk Assessment, Phase I Technical Memorandum	Ghazi, Rizgar A California Department of Toxic Substances Control	1075 CD 4
16 Jun 95	Action Plan Concerning Additional Work to Address Agency Concerns on RI/FS, Draft Final Report, SCOU	AFCEE/ERB	1076 CD 4
20 Jun 95	LTM Program Report, Preliminary Findings of Millipurge Study	Jacobs Engineering Group, Inc.	1295 CD 6

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29 Jun 95	EPA Letter to Base Concerning Plan for RI/FS, SCOU	Roberts, David E EPA Region IX	1298 CD 6
Jul 95	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Talking Paper NFA Decision, Fuel Spill Site-2	Ghazi, Rizgar A California Department of Toxic Substances Control	1116 CD 5
Jul 95	Summary of Groundwater Monitoring Report, 2nd Quarter 95	Jacobs Engineering Group, Inc.	1137 CD 5
07 Jul 95	Domestic Well Sampling Results, Jun 95	Jacobs Engineering Group, Inc.	1108 CD 5
07 Jul 95	Low Flow Rate Purge Study Report	Jacobs Engineering Group, Inc.	1109 CD 5
12 Jul 95	CRWQCB Letter to CDTSC Concerning Deleting the RA, Fuel Spill-2	Izzo, Victor J California Regional Water Quality Control Board	1111 CD 4
12 Jul 95	Base Letter to Distribution Concerning Proposed Well Abandonment Work Plan, Well Sampling Results and LTM Sampling Plan	Matthews, Robert R AFBCA/OL-I	1306 CD 6
14 Jul 95	CRWQCB Letter to Base Concerning Closure Plan, Fuel Hydrant System	Izzo, Victor J California Regional Water Quality Control Board	1307 CD 6
18 Jul 95	RPM Meeting Minutes, 18 Jul 95	AFBCA/OL-I	1112 CD 4
18 Jul 95	RPM and TWG Draft Meeting Minutes, Jul 95	AFBCA/OL-I	1114 CD 5

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26 Jul 95	EPA Letter to Base Concerning Talking Paper Justification for NFA, Fuel Spill Site-2	Roberts, David E EPA Region IX	1115 CD 5
27 Jul 95	EPA Letter to Base Concerning Comments on LTM Sampling Plan, Low Flow Rate Purge Study Reports	Roberts, David E EPA Region IX	1117 CD 5
27 Jul 95	CRWQCB Letter to CDTSC Concerning Work Plan for Proposed Well Abandonment	Izzo, Victor J California Regional Water Quality Control Board	1308 CD 6
01 Aug 95	EPA Letter to Base Concerning Final Approved Position, LTM Sampling Plan, Low-Flow Rate Purge Study Report	Roberts, David E EPA Region IX	1129 CD 5
11 Aug 95	Base Letter to CDTSC and EPA Concerning Request for Extension of the FFA Schedule, Revised Design Basis Report, OU-1	Matthews, Robert R AFBCA/OL-I	1126 CD 5
16 Aug 95	EPA and CDTSC Letter to Base Concerning Response and Conditions to Granting FFA Extension, Revised Design Basis Report, OU-1	Roberts, David E Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1127 CD 5
17 Aug 95	CDTSC Memorandum Concerning LTM Program Work Plan	Scruggs, Mary California Department of Toxic Substances Control	1313 CD 6
23 Aug 95	FSP, SVE Optimization, Fuel Spill-1	Jacobs Engineering Group, Inc.	1128 CD 5
24 Aug 95	CRWQCB Letter to CDTSC Concerning Report of 3rd Quarter Groundwater Pump and Treat	Izzo, Victor J California Regional Water Quality Control Board	1326 CD 6

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28 Aug 95	Summary of Domestic Well Monitoring Data, LTM Program, May-Jul 95	Jacobs Engineering Group, Inc.	1120 CD 5
28 Aug 95	FSP, SVE Optimization, Fuel Spill-1	Jacobs Engineering Group, Inc.	1121 CD 5
30 Aug 95	Base Letter to EPA and CDTSC Concerning Request for Extension of FFA Schedule for CB and RI/FS, Draft Final Report, SCOU	Matthews, Robert R AFBCA/OL-I	1122 CD 5
30 Aug 95	CDTSC Letter to Resident Concerning RAB Meeting, 05 Sep 95	Owens, Ron California Department of Toxic Substances Control	1329 CD 6
Sep 95	Fact Sheet, Enviro Progress Newsletter, Edition 6	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1141 CD 5
01 Sep 95	Final O&M Plan	Laguna Construction Company Inc	1926 CD 10
07 Sep 95	Final Action Memorandum, Removal Action, FTA-1, DA-4, DBF, and Bldg 871	AFBCA/OL-I	1139 CD 5
11 Sep 95	CRWQCB Letter to Base Concerning Proposal for Background Compared to On-Base Dioxins	Izzo, Victor J California Regional Water Quality Control Board	1132 CD 5
11 Sep 95	Jacobs Letter to AFCEE Concerning Response to EPA and CRWQCB Comments on Work Plan, Proposed Well Abandonment	McLeod, Campbell Jacobs Engineering Group, Inc.	1136 CD 5
11 Sep 95	CRWQCB Letter to CDTSC Concerning Request for Landfill Remediation	Izzo, Victor J California Regional Water Quality Control Board	1138 CD 5

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12 Sep 95	RAB Meeting Minutes, 12 Sep 95	AFBCA/OL-I	1135 CD 5
12 Sep 95	RPM Meeting Minutes, 12 Sep 95	AFBCA/OL-I	1145 CD 5
14 Sep 95	Summary of Domestic Well Monitoring Report, LTM Program, Aug 95	Jacobs Engineering Group, Inc.	1134 CD 5
14 Sep 95	Final Action Plan for Additional Work to Address Regulatory Comments on RI/FS, SCOU	AFCEE/ERB	1418 CD 6
15 Sep 95	Final Management Plan	Laguna Construction Company Inc	1925 CD 10
20 Sep 95	EPA Letter to Base Concerning Comments on Ecological Risk Assessment, Phase I Technical Memorandum	Roberts, David E EPA Region IX	1131 CD 5
21 Sep 95	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Draft Groundwater Pump and Treat Report, 3rd Quarter, OT-29	Ghazi, Rizgar A California Department of Toxic Substances Control	1331 CD 6
28 Sep 95	TWG Meeting Minutes, 28 Sep 95	Jacobs Engineering Group, Inc.	1133 CD 5
28 Sep 95	Base Letter to CRWQCB Concerning No Point Source of Dioxins on Base	Matthews, Robert R AFBCA/OL-I	1140 CD 5
Oct 95	Summary of Groundwater Monitoring, 3rd Quarter 95	Jacobs Engineering Group, Inc.	1165 CD 6
Oct 95	Final Construction Quality Plan Addendum	Laguna Construction Company Inc	1927 CD 10

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03 Oct 95	TWG Meeting Minutes, 03-05 Oct 95	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1146 CD 5
03 Oct 95	CRWQCB Letter to CDTSC Concerning Soil Gas Data Quality Analysis	Izzo, Victor J California Regional Water Quality Control Board	1355 CD 6
17 Oct 95	Final Addendum to Work Plan for Proposed Well Abandonment	Jacobs Engineering Group, Inc.	1130 CD 5
17 Oct 95	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Soil Gas Data Quality	Ghazi, Rizgar A California Department of Toxic Substances Control	1143 CD 5
18 Oct 95	RPM Draft Meeting Minutes, 18 Oct 95	AFBCA/OL-I	1144 CD 5
25 Oct 95	CDTSC Letter to Base Concerning NOD, RCRA Closure Plan, Hazardous Waste Drum Storage Facility	O'Neal, Douglas P California Department of Toxic Substances Control	1422 CD 6
26 Oct 95	CDTSC Letter to RAB Members Concerning Community Member Caucus	Owens, Ron California Department of Toxic Substances Control	1374 CD 6
27 Oct 95	Establishing Threshold Background Values Study for Inorganic Constituents in Soils	Mitre Corp.	1421 CD 6
Nov 95	Fact Sheet, Enviro Fact Sheet, Edition 4	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1142 CD 5
Nov 95	Fact Sheet, Enviro Progress Newsletter, Edition 7	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1147 CD 5

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01 Nov 95	SOW, RA Draft	AFBCA/OL-I	1427 CD 6
01 Nov 95	Removal Actions, Presentation Slides, DBF, FTA-1, DA-4, Bldg 871	Guyer, Keith Jacobs Engineering Group, Inc.	1428 CD 6
02 Nov 95	Final Quality Program Plan, Parts 1 and 3	Jacobs Engineering Group Inc	1928 CD 10
08 Nov 95	MDPH Letter to CDTSC Concerning Comments on Basewide EBS, FOST, and FOSL	Palsgaard, Jeff H Merced County Department of Public Health	09 CD 2
08 Nov 95	Jacobs Letter to AFCEE Concerning FSP Review, Bldg 551 and Aircraft Maintenance Hangar F-4	Lange, Peter Jacobs Engineering Group, Inc.	1415 CD 6
13 Nov 95	MDPH Letter to Base Concerning Landfills	Palsgaard, Jeff H Merced County Department of Public Health	1506 CD 6
15 Nov 95	Jacobs Letter to AFCEE Concerning Draft SCOU Unit Work Plan and FSP Update, Proposed Sampling Figure	Lange, Peter Jacobs Engineering Group, Inc.	1200 CD 6
21 Nov 95	RAB Meeting Minutes, 21 Nov 95	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1151 CD 5
27 Nov 95	Office of Historic Preservation Letter to AFCEE Concerning Archeological Investigation	Widell, Cherilyn Historic Preservation, Department of Parks and Recreation	1148 CD 5
28 Nov 95	EPA Letter to Base Concerning Superfund Boundaries	Roberts, David E EPA Region IX	1766 CD 9

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29 Nov 95	Jacobs Letter to AFCEE Concerning FSP, Bldg 1205, Structure 1201, Sewer Segment 6 and DA-2	Lange, Peter Jacobs Engineering Group, Inc.	1416 CD 6
Dec 95	Treatability Study and SVE Demonstration Project Report, Fuel Spill-1, Fuel Spill-2	Jacobs Engineering Group, Inc.	1150 CD 5
Dec 95	RI, Draft Final Report, Addenda to Section 7, Not Requiring Additional RI Field Work, SCOU	Jacobs Engineering Group, Inc.	1152 CD 5
Dec 95	Final HSP Addendum	Laguna Construction Company Inc	1929 CD 10
Dec 95	Comprehensive Basewide Scoping and Phase I Ecological Risk Assessment Study	Jacobs Engineering Group, Inc.	1930 CD 10
06 Dec 95	CRWQCB Letter to Base Concerning SAP for Removal Actions, FT-01, SD-12, SS-70	Izzo, Victor J California Regional Water Quality Control Board	1375 CD 6
06 Dec 95	EPA Letter to Base Concerning Comments on Environmental SAP	Roberts, David E EPA Region IX	1377 CD 6
12 Dec 95	RPM Meeting Minutes, 12 Dec 95	Matthews, Robert R AFBCA/OL-I	1190 CD 6
18 Dec 95	Jacobs Letter to AFCEE Concerning FSP Review, QAPP Addendum	Lange, Peter Jacobs Engineering Group, Inc.	1417 CD 6
Jan 96	LTM Sampling Plan, OT-29, OT-30, SD-12	Jacobs Engineering Group, Inc.	1170 CD 6
Jan 96	Fact Sheet, Enviro Progress Newsletter, Edition 8	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1180 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
11 Jan 96	Regulators Letter to Base Concerning NOV of ROD and FFA, OT-29	Roberts, David E Ghazi, Rizgar A Izzo, Victor J EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	1381 CD 6
16 Jan 96	CERCLA, 42 USC Chapter 103	HQ USEPA	1528 CD 6
20 Jan 96	Update Pages, RI/FS, Final Comprehensive Basewide Groundwater Report	Jacobs Engineering Group, Inc.	1768 CD 9
22 Jan 96	Jacobs Letter to AFCEE/ERB Concerning Response to Comments on Draft SAP for Removal Actions, Bldg 871, FTA-1, DA-4	Guyer, Keith Jacobs Engineering Group, Inc.	1179 CD 6
23 Jan 96	RAB Meeting Minutes, 23 Jan 96	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1149 CD 5
23 Jan 96	RPM Meeting Minutes, 23 Jan 96	AFBCA/OL-I	1175 CD 6
23 Jan 96	CDTSC Letter to MDPH Concerning Landfills	Ward, Daniel T California Department of Toxic Substances Control	1211 CD 6
23 Jan 96	CDTSC Letter to MDPH Concerning Comments on Base Landfills	Ward, Daniel T California Department of Toxic Substances Control	1931 CD 10
25 Jan 96	Base Letter to Regulators Concerning Septic Tank Reuse Proposal	Matthews, Robert R AFBCA/OL-I	1183 CD 6

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30 Jan 96	EPA Memorandum Concerning QAPP Addendum, SCOU	Hanusiak, Lisa EPA Region IX	1208 CD 6
30 Jan 96	EPA Letter to Base Concerning SVE Demonstration Project Report, SS-18	Roberts, David E EPA Region IX	1382 CD 6
30 Jan 96	Base Letter to Regulators Concerning NOV, ROD and FFA, OT-29	Matthews, Robert R AFBCA/OL-I	1386 CD 6
30 Jan 96	EPA Letter to Resident Concerning Participation at Current RAB Meeting	Roberts, David E EPA Region IX	1767 CD 9
Feb 96	Fact Sheet, Enviro Fact Sheet, Edition 5	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1154 CD 5
Feb 96	RA, Final QPP, Part 2, Detonation and Burn Facility, FT-01, DA-4, Bldg 871	Jacobs Engineering Group, Inc.	1155 CD 5
01 Feb 96	Regulators Letter to Base Concerning Base Response to NOV of ROD and FFA, OU-1	Roberts, David E Ghazi, Rizgar A Izzo, Victor J EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	1178 CD 6
05 Feb 96	EPA Letter to Base Concerning Reuse of Septic Systems, SS-116	Roberts, David E EPA Region IX	1387 CD 6
06 Feb 96	CDTSC Letter to Base Concerning Request for Review Extension on RI/FS, Draft Final Comprehensive Basewide Report, Part I Groundwater	Ghazi, Rizgar A California Department of Toxic Substances Control	1177 CD 6

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08 Feb 96	TWG Meeting Minutes, 08 Feb 96	Matthews, Robert R AFBCA/OL-I	1196 CD 6
08 Feb 96	Draft Update Field Work Status Report, SCOU	Jacobs Engineering Group, Inc.	1413 CD 6
08 Feb 96	Draft Position Paper Report, Inorganic Background for RI, Revised Draft Final Report, SCOU	Jacobs Engineering Group, Inc.	1414 CD 6
12 Feb 96	Base Letter to Regulators Concerning Reuse of Septic System, SS-116	Matthews, Robert R AFBCA/OL-I	1390 CD 6
15 Feb 96	RI, Draft Final Report, Addenda to Section 7, Sites Not Requiring Additional RI Field Work, SCOU	Jacobs Engineering Group, Inc.	1153 CD 5
15 Feb 96	EPA Letter to Base Concerning Comments on RI/FS, Draft Final Comprehensive Basewide Report, Part I	Roberts, David E EPA Region IX	1214 CD 6
16 Feb 96	Revised TWG Meeting Minutes and Conversion Confirmer, 08 Feb 96	Matthews, Robert R AFBCA/OL-I	1173 CD 6
16 Feb 96	Base Letter to Distribution Concerning Draft FFA Schedule	Matthews, Robert R AFBCA/OL-I	1195 CD 6
21 Feb 96	RPM Draft Meeting Minutes, 21 Feb 96	Kumanchik, Cynthia Gutierrez-Palmenberg, Inc.	1171 CD 6
26 Feb 96	TWG Meeting Minutes, 26 Feb 96	Phillips, Larry Jacobs Engineering Group, Inc.	1192 CD 6

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29 Feb 96	CRWQCB Letter to CDTSC Concerning Comments on RI/FS, Draft Final Comprehensive Basewide Report, Part I	Izzo, Victor J California Regional Water Quality Control Board	1169 CD 6
Mar 96	Fact Sheet, Enviro Progress Newsletter, Edition 9	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1319 CD 6
Mar 96	Treatability Study and Technical Report, SS-17, SS-18	Jacobs Engineering Group, Inc.	1391 CD 6
01 Mar 96	Preliminary Data Figures, SCOU	Phillips, Larry Jacobs Engineering Group, Inc.	1309 CD 6
06 Mar 96	MDPH Letter to EPA Concerning NFA Required, LF-34	Palsgaard, Jeff H Merced County Department of Public Health	1168 CD 6
06 Mar 96	BCT/TWG Draft Meeting Minutes, 05 Mar 96	Matthews, Robert R AFBCA/OL-I	1194 CD 6
12 Mar 96	CDTSC Memorandum Concerning Comments on Revised Draft Basis of Design Report	Scruggs, Mary California Department of Toxic Substances Control	1167 CD 6
14 Mar 96	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Revised Draft Basis of Design Report	Ghazi, Rizgar A California Department of Toxic Substances Control	1166 CD 6
14 Mar 96	Base Letter to Regulators Concerning Revised Basis of Design Report Issues From BCT Meeting	Matthews, Robert R AFBCA/OL-I	1184 CD 6
15 Mar 96	EPA Letter to Base Concerning Comments on the Revised Draft Basis of Design Report	Roberts, David E EPA Region IX	1185 CD 6

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18 Mar 96	Jacobs Letter to AFCEE Concerning Response to Agency Comments on FS, Draft Report, SCOU	Jacobs Engineering Group, Inc.	1198 CD 6
19 Mar 96	Step-Out and Metals Sampling Locations and Analysis, SCOU	Jacobs Engineering Group, Inc.	1164 CD 5
22 Mar 96	Jacobs Letter to AFCEE Concerning Draft Response to Agency Comments on RI/FS, Comprehensive Basewide Report	Phillips, Larry Jacobs Engineering Group, Inc.	1297 CD 6
25 Mar 96	EPA Letter to Base Concerning Comments on Preliminary Draft Comprehensive Basewide Groundwater Proposed Plan, Part I	Roberts, David E EPA Region IX	1206 CD 6
26 Mar 96	CDTSC Letter to EPA Concerning Denial for NFA, Castle Vista Landfill A	Ghazi, Rizgar A California Department of Toxic Substances Control	1163 CD 5
26 Mar 96	RAB Draft Meeting Minutes, 26 Mar 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1181 CD 6
26 Mar 96	RPM Draft Meeting Minutes, 26 Mar 96	Matthews, Robert R AFBCA/OL-I	1191 CD 6
26 Mar 96	RPM Meeting Minutes, 26 Mar 96	Matthews, Robert R AFBCA/OL-I	1223 CD 6
26 Mar 96	CDTSC Letter to EPA Concerning NFA Decision, Castle Vista Landfill A	Ward, Daniel T California Department of Toxic Substances Control	1234 CD 6
27 Mar 96	Base Letter to EPA and Bechtel Concerning Final FSP for RA, Bldg 871, Detonation and Burn Facility, FT-01, and DA-4	Matthews, Robert R AFBCA/OL-I	1186 CD 6

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Apr 96	RA, Proposed Plan, Draft Final Groundwater, Comprehensive Basewide Program, Part I	Jacobs Engineering Group, Inc.	1229 CD 6
Apr 96	Fact Sheet, Enviro Fact Sheet, Edition 6	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1314 CD 6
02 Apr 96	Base Letter to EPA and CDTSC Concerning Request for Extension on RI/FS, Comprehensive Basewide Draft Final Report, Part I	Matthews, Robert R AFBCA/OL-I	1161 CD 5
03 Apr 96	RI/FS Conference Call Meeting Minutes, 03 Apr 96	Allen, Elizabeth Jacobs Engineering Group, Inc.	1197 CD 6
03 Apr 96	CDTSC Comments on Preliminary Draft Comprehensive Basewide Part I Groundwater Proposed Plan	California Department of Toxic Substances Control	1296 CD 6
05 Apr 96	AFBCA Letter Concerning Extension to Deadlines for RI/FS at BRAC Installations on NPL	Olsen, Alan K AFBCA/DR	1159 CD 5
05 Apr 96	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on SVE Demonstration Project Report, Fuel Spill 2	Ghazi, Rizgar A California Department of Toxic Substances Control	1294 CD 6
08 Apr 96	EPA Letter to Base Concerning Review of Response to Comments on RI/FS, Draft Final Risk Assessment, SCOU	Roberts, David E EPA Region IX	1158 CD 5
08 Apr 96	Joint Power Authority Letter to Base Concerning Production Well Closure	Martin, Richard D Castle Joint Powers Authority	1205 CD 6

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09 Apr 96	EPA and CDTSC Letter to Base Concerning Approval of Request for Extension, FFA for RI/FS, Comprehensive Basewide Draft Final Report, Part I	Roberts, David E Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1157 CD 5
10 Apr 96	EPA Letter to Base Concerning Base Responses to EPA Comments on RI/FS, Draft Final Report, SCOU	Roberts, David E EPA Region IX	1303 CD 6
11 Apr 96	CRWQCB Letter to CDTSC Concerning Review of RI/FS Response to Comments, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1204 CD 6
11 Apr 96	TWG Meeting Minutes, 11 Apr 96	Phillips, Larry Jacobs Engineering Group, Inc.	1224 CD 6
18 Apr 96	MDPH Letter to Joint Power Authority Concerning Draft Resolution on Landfill Closures	Palsgaard, Jeff H Merced County Department of Public Health	1504 CD 6
18 Apr 96	MDPH Letter to Base Concerning RAB Meeting Discussion of Landfill Issues	Palsgaard, Jeff H Merced County Department of Public Health	1505 CD 6
22 Apr 96	EPA Letter to Base Concerning Restart Sampling Plan Revision, OT-29	Roberts, David E EPA Region IX	1396 CD 6
23 Apr 96	Base Letter to San Joaquin Valley Concerning ERC Background Information	Matthews, Robert R AFBCA/OL-I	1227 CD 6
24 Apr 96	CRWQCB Letter to CDTSC Concerning Review of Response to Comments on RI/FS, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1220 CD 6

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24 Apr 96	RPM Meeting Minutes, 24 Apr 96	Matthews, Robert R AFBCA/OL-I	1221 CD 6
24 Apr 96	CDTSC Letter to Base Concerning Review of Response to Agency Comments on RI, Draft Final Report, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1225 CD 6
24 Apr 96	RPM Draft Meeting Minutes, 24 Apr 96	Matthews, Robert R AFBCA/OL-I	1226 CD 6
24 Apr 96	CRWQCB Letter to Base Concerning Update of Order No. 92-181	Izzo, Victor J California Regional Water Quality Control Board	1302 CD 6
May 96	Fact Sheet, Enviro Progress Newsletter, Edition 10	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1320 CD 6
May 96	RAB Meeting Minutes, May 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1342 CD 6
01 May 96	ROD, Draft Comprehensive Basewide, Part I Groundwater	AFBCA/OL-I	1187 CD 6
08 May 96	EPA Letter to Base Concerning Annual Report, O&M and Monitoring, Groundwater Pump and Treat, OU-1	Roberts, David E EPA Region IX	1305 CD 6
08 May 96	ROD, Proposed VOC Remediation Language	AFBCA/OL-I	2082 CD 11
09 May 96	Jacobs Letter to Base Concerning Response to Comments on RI/FS, Draft Comprehensive Basewide Report, Part I	Phillips, Larry Jacobs Engineering Group, Inc.	1213 CD 6

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09 May 96	RPM/TWG Meeting Minutes, 09 May 96	Matthews, Robert R AFBCA/OL-I	1222 CD 6
13 May 96	CDTSC Memorandum Concerning Comments on Scoping and Phase I Ecological Risk Assessment	Chernoff, Gerald F California Department of Toxic Substances Control	2083 CD 11
16 May 96	EPA Letter to Base Concerning Comments on Draft Final Comprehensive Basewide Part I, Groundwater Proposed Plan	Roberts, David E EPA Region IX	1304 CD 6
20 May 96	CRWQCB Letter to Base Concerning Review of Annual Report of O&M and Monitoring, OT-29	Izzo, Victor J California Regional Water Quality Control Board	1397 CD 6
21 May 96	Base Letter to USACE Concerning Notification of Proposed Action, ETC-10	Matthews, Robert R AFBCA/OL-I	1237 CD 6
23 May 96	CDTSC Memorandum Concerning Draft Verification/Validation Phase II Ecological Risk Assessment, SAP	Chernoff, Gerald F California Department of Toxic Substances Control	2084 CD 11
23 May 96	EPA Memorandum Concerning Draft Verification/Validation Phase II Ecological Risk Assessment, SAP	Black, Ned EPA Region IX	2085 CD 11
28 May 96	EPA Letter to Base Concerning Draft Verification/Validation Phase II Ecological Risk Assessment, SAP	Roberts, David E EPA Region IX	2086 CD 11
30 May 96	Press Release, RAB Announcement, The Next Castle RAB Meeting Will be Held 30 May 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1219 CD 6
31 May 96	FAA Letter to Base Concerning FAA and Base MOA	Wilkerson, Robin F Federal Aviation Administration	1379 CD 6

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31 May 96	CDTSC Letter to Base Concerning Draft Verification/Validation Phase II Ecological Risk Assessment, SAP	Ghazi, Rizgar A California Department of Toxic Substances Control	2087 CD 11
31 May 96	Base Memorandum Concerning Draft Verification/Validation Phase II Ecological Risk Assessment, SAP	Porter, Ron PhD AL/OEMH	2088 CD 11
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendix B, Vol II of III	Jacobs Engineering Group, Inc.	1059 CD 4
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendix F	Jacobs Engineering Group, Inc.	1061 CD 4
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol III of III	Jacobs Engineering Group, Inc.	1062 CD 4
Jun 96	RI/FS, Final, Comprehensive Basewide Groundwater, Part I, Baseline Human Health Risk Assessment, Vol II of III	Jacobs Engineering Group, Inc.	1065 CD 4
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendices C, D and E	Jacobs Engineering Group, Inc.	1071 CD 5
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendices G, H, I, J, K, L and M	Jacobs Engineering Group, Inc.	1072 CD 5
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendix B, Vol III of III	Jacobs Engineering Group, Inc.	1074 CD 4

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Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendix A	Jacobs Engineering Group, Inc.	1098 CD 5
Jun 96	RI/FS, Final Comprehensive Basewide Groundwater Report, Part I, Vol I of III, Appendix B, Vol I of III	Jacobs Engineering Group, Inc.	1106 CD 5
Jun 96	Draft Final Comprehensive Basewide Part I, Proposed Plan	AFBCA/OL-I	1182 CD 6
Jun 96	RA, Draft Technical Report, SS-70	Jacobs Engineering Group, Inc.	1283 CD 6
Jun 96	Fact Sheet, Enviro Fact Sheet, Edition 7	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1315 CD 6
Jun 96	Newspaper Article, "Leftover Landfills Raise Castle Reuse Questions"	Carlson, Ken The Merced Sun Star	1336 CD 6
Jun 96	RA, Final Proposed Plan for Groundwater, Comprehensive Basewide Program, Part 1	Jacobs Engineering Group, Inc.	1771 CD 9
05 Jun 96	CDTSC Letter to Base Concerning Phase I Ecological Risk Assessment	Ghazi, Rizgar A California Department of Toxic Substances Control	2089 CD 11
10 Jun 96	Newspaper Article, "Public Comment Period and Meeting Announcement on Comprehensive Basewide Program Part 1-Proposed Plan for RA of Groundwater"	AFBCA/OL-I	2091 CD 11
13 Jun 96	EPA Letter to Base Concerning Draft Comprehensive Basewide Program-Part 1 ROD	Roberts, David E EPA Region IX	2090 CD 11

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19 Jun 96	Base Letter to Regulators Concerning Revised Figure 2 for Air Monitoring, OU-1	Matthews, Robert R AFBCA/OL-I	1769 CD 9
24 Jun 96	CDTSC Letter to Base Concerning ARARs, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1378 CD 6
24 Jun 96	Base Letter to Regulators Concerning Final Removal Actions Update, OT-30, SD-12, SS-61	Matthews, Robert R AFBCA/OL-I	1399 CD 6
24 Jun 96	Base Letter to AFCEE Concerning Submittal of Final Comprehensive Basewide Groundwater Proposed Plan, Part 1	Matthews, Robert R AFBCA/OL-I	1770 CD 9
25 Jun 96	Draft Technical Report, Detonation Burn Facility	Jacobs Engineering Group, Inc.	1284 CD 6
25 Jun 96	RAB Base Tour Summary	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1343 CD 6
27 Jun 96	RPM Meeting Minutes, 27 Jun 96	Matthews, Robert R AFBCA/OL-I	1286 CD 6
Jul 96	LTM Sampling Plan, Semiannual Report, OT-29, OT-30, SD-12	Jacobs Engineering Group, Inc.	1172 CD 6
Jul 96	RA, Design Letter Report, DA-4	Jacobs Engineering Group, Inc.	1239 CD 6
Jul 96	Draft QAPP	Jacobs Engineering Group, Inc.	1287 CD 6
Jul 96	Fact Sheet, Enviro Progress Newsletter, Edition 11	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1321 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
Jul 96	RA, Repair Enhancement and Future Expansion, Well Installation Report, OU-1	Jacobs Engineering Group, Inc.	1360 CD 6
Jul 96	FSP, Addendum, OU-1	AFBCA/OL-I	1772 CD 9
01 Jul 96	EPA Letter to Base Concerning Review of Addendum to Work Plan, OU-1	Lowe, Debbie EPA Region IX	1775 CD 9
08 Jul 96	EPA and CDTSC Letter to Base Concerning Request for Extension on FFA Schedule for SCOU Draft Final RI/FS	Lowe, Debbie Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	2092 CD 11
09 Jul 96	CDTSC Letter to Base Concerning Action Memoranda, SCOU, DA-8, PCB-9, ETC-10	Ghazi, Rizgar A California Department of Toxic Substances Control	1404 CD 6
15 Jul 96	CRWQCB Letter to Base Concerning Proposed Cleanup Level Evaluation, UST and OWS Removal Program	Izzo, Victor J California Regional Water Quality Control Board	1401 CD 6
15 Jul 96	CDTSC Letter to Base Concerning Comments on Draft Explanation of Significant Difference, OU-1	Ghazi, Rizgar A California Department of Toxic Substances Control	2093 CD 11
23 Jul 96	Base, EPA, and CDTSC Letter to Bureau of Prisons Concerning Detonation Burn Facility	Matthews, Robert R Lowe, Debbie Ghazi, Rizgar A AFBCA/OL-I EPA Region IX California Department of Toxic Substances Control	1280 CD 6

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23 Jul 96	Public Meeting Transcript, Comprehensive Basewide Part I Proposed Plan, 23 Jul 96	Maciel, Teresa Certified Shorthand Reporter	1341 CD 6
24 Jul 96	RPM Meeting Minutes, 24 Jul 96	Matthews, Robert R AFBCA/OL-I	1310 CD 6
25 Jul 96	Fact Sheet, Proposed Range Rule	AFBCA/OL-I	1299 CD 6
Aug 96	Final Technical Report, Detonation Burn Facility	Jacobs Engineering Group, Inc.	1285 CD 6
Aug 96	Journal Article, "A Needle in a Haystack"	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1363 CD 6
02 Aug 96	Base Letter to Distribution Concerning Response to Comments on Basewide Cleanup Level Evaluation, UST and OWS Removal Program	Matthews, Robert R AFBCA/OL-I	1402 CD 6
06 Aug 96	Base Letter to Regulators Concerning Response to Agency Comments on Revised Final Basis of Design Report	Matthews, Robert R AFBCA/OL-I	1359 CD 6
07 Aug 96	Newspaper Article, "Groundwater Contamination Moving West"	Kayser, Jim The Atwater Signal	1340 CD 6
07 Aug 96	MDPH Letter to Base Concerning Comments on RA, Proposed Plan for Groundwater	Palsgaard, Jeff H Merced County Department of Public Health	1774 CD 9
09 Aug 96	Base Letter to AFCEE Concerning Draft Final Explanation of Significant Difference, OU-1	Matthews, Robert R AFBCA/OL-I	1773 CD 9

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14 Aug 96	Newspaper Article, "Groundwater Plume Worries Leslie Drive Residents"	Kayser, Jim The Atwater Signal	1339 CD 6
14 Aug 96	CIWMB Letter to CDTSC Concerning Closure Requirements, Castle Vista Landfill A	Zielinski, Tamara S California Integrated Waste Management Board	1400 CD 6
21 Aug 96	Base Memorandum Concerning ARAR Support for Time Critical Action Memorandums, Removal Action on Two SCOU Sites	Matthews, Robert R AFBCA/OL-I	2094 CD 11
24 Aug 96	Newspaper Article, "Public Notice, What is Happening at Castle Airport? Meet Castle's RAB"	The Merced Sun Star	1330 CD 6
26 Aug 96	CDTSC Letter to Base Concerning Comments on RA, Draft Technical Report, Bldg 871	Ghazi, Rizgar A California Department of Toxic Substances Control	1243 CD 6
26 Aug 96	CDTSC Letter to Base Concerning NFA Decision, Detonation Burn Facility	Landis, Anthony J California Department of Toxic Substances Control	1244 CD 6
27 Aug 96	Base Letter to Regulators Concerning Draft QPP and Work Plan Addendum	Matthews, Robert R AFBCA/OL-I	1290 CD 6
27 Aug 96	RAB Meeting Minutes, 27 Aug 96	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1361 CD 6
27 Aug 96	PFFA Meeting Slides Concerning EPA Risk Execution Strategy for Clean-Up	Lee, Charles E EPA Region IX	1383 CD 6
28 Aug 96	RPM/TWG Meeting Minutes, 28 Aug 96	Matthews, Robert R AFBCA/OL-I	1362 CD 6

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28 Aug 96	Fact Sheet, Air Emissions From Primary Air Stripper at Treatment Plant	AFBCA/OL-I	1371 CD 6
28 Aug 96	Explanation of Significant Difference, Discontinuation of Vapor Phase Treatment of Air Stripper Off Gas and Non-Implementation of Biological Enhancement, OU-1	Jacobs Engineering Group, Inc.	1380 CD 6
29 Aug 96	Base Letter to EPA Concerning Distributed Items From RPM Meeting, 28 Aug 96	Matthews, Robert R AFBCA/OL-I	1394 CD 6
Sep 96	RA, Design Letter Report, FT-01	AFBCA/OL-I	1246 CD 6
Sep 96	Fact Sheet, Enviro Progress Newsletter, Edition 12	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1322 CD 6
Sep 96	Community Relations Plan (CRP)	Gutierrez-Palmenberg, Inc.	1325 CD 6
Sep 96	RAB Meeting Minutes, Sep 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1344 CD 6
Sep 96	Design Letter Report for Removal Action, FT-001	Jacobs Engineering Group, Inc.	2095 CD 11
04 Sep 96	AFLSA Letter to Base Concerning Comments on ARAR Table in ROD, Draft, CBOU	Bee, Arlen Eric, Capt AFLSA/JACE-WR	1389 CD 6
19 Sep 96	CDTSC Letter to Base Concerning Comments on RI, Preliminary Draft Final Addenda for Action Plan Sites, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1395 CD 6

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20 Sep 96	Results of Jacobs Checkout of System Repair and Expansion, OU-1	Jacobs Engineering Group, Inc.	1384 CD 6
20 Sep 96	Resident Letter to Mayor of Atwater Concerning City of Atwater Water System	Resident	1388 CD 6
23 Sep 96	EPA Letter to Program Managers Concerning Potential Impacts of the Eureka Laboratory Fraud Case on Federal Facilities Cleanup	Opalski, Daniel D EPA Region IX	1398 CD 6
Oct 96	RA, SVE Startup Letter Report, DA-4	AFBCA/OL-I	1248 CD 6
Oct 96	Draft SVE-Bioventing Transition Letter Report, Fuel Spill 1	Jacobs Engineering Group, Inc.	1252 CD 6
Oct 96	RAB Meeting Minutes, Oct 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1345 CD 6
Oct 96	RA, Final Technical Report, SS-70	Jacobs Engineering Group, Inc.	1419 CD 6
Oct 96	SVE Startup Letter Report, DA-4	Jacobs Engineering Group, Inc.	1440 CD 6
01 Oct 96	Base Letter to EPA and CRWQCB Concerning Final RCRA Closure Plan, Hazardous Waste Drum Storage Area	Matthews, Robert R AFBCA/OL-I	1288 CD 6
02 Oct 96	Action Memorandum, Removal Action, DA-8	AFBCA/OL-I	1403 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
07 Oct 96	Newspaper Article, "Public Notice, The USAF Announces Finalization of the Explanation of Significant Difference Document for the Discontinuation of Vapor Phase Treatment of Air Stripper Off Gas and Non-Implementation of Biological Enhancement"	The Merced Sun Star	1332 CD 6
08 Oct 96	Action Memorandum, Removal Action, ETC-10	AFBCA/OL-I	1247 CD 6
16 Oct 96	Base Letter to Regulators Concerning RA, Final Technical Report, Bldg 871	Matthews, Robert R AFBCA/OL-I	1249 CD 6
16 Oct 96	Base Letter to Regulators Concerning Response to Comments on Demonstration Project Report, Fuel Spill 2	Matthews, Robert R AFBCA/OL-I	1250 CD 6
17 Oct 96	Base Letter to Regulators Concerning Disclaimer Included in Base Reports	Matthews, Robert R AFBCA/OL-I	1289 CD 6
21 Oct 96	CDTSC Letter to Base Concerning Review of RA, Action Memorandum, DA-8	Ghazi, Rizgar A California Department of Toxic Substances Control	1253 CD 6
23 Oct 96	RPM Meeting Minutes, 23 Oct 96	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1311 CD 6
24 Oct 96	MDPH Letter to Base Concerning RAB	Palsgaard, Jeff H Merced County Department of Public Health	1393 CD 6
30 Oct 96	Newspaper Article, "Castle Vista Landfills To Be Removed"	Kayser, Jim The Atwater Signal	1337 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
Nov 96	Fact Sheet, Enviro Fact Sheet, Edition 8	Woolfolk, Lisa Gutierrez-Palmenberg, Inc.	1316 CD 6
Nov 96	RAB Meeting Minutes, Nov 96	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1346 CD 6
04 Nov 96	Jacobs Letter to CDTSC Concerning Comprehensive Basewide Part II SCOU, Site Risk on Isopleth Maps	Watkin, Geoff W Jacobs Engineering Group, Inc.	1372 CD 6
13 Nov 96	EPA Letter to Base Concerning Comments on Draft QAPP	Hanusiak, Lisa EPA Region IX	1776 CD 9
20 Nov 96	Newspaper Article, "Public Notice, The United States Air Force Announces the Intent to Operate a SVE System at Castle Air Force Base"	The Merced Sun Star	1255 CD 6
20 Nov 96	EPA and CDTSC Letter to Base Concerning FAA Schedule Extension for Comprehensive Basewide ROD, Part I	Hanusiak, Lisa Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1392 CD 6
21 Nov 96	Base Letter to Regulators Concerning Public Notice for RA, DA-8	Matthews, Robert R AFBCA/OL-I	1777 CD 9
23 Nov 96	Newspaper Article, "Come and See Our Progress at Castle Airport"	The Merced Sun Star	1328 CD 6
23 Nov 96	Newspaper Article, "Castle Cleanup Begins"	White, Bob The Merced Sun Star	1334 CD 6
26 Nov 96	Newspaper Article, "New Process Cleans Water"	Groves, Randy The Merced Sun Star	1333 CD 6

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29 Nov 96	EPA Letter to Base Concerning RI/FS, Draft Final Report, SCOU	Hanusiak, Lisa EPA Region IX	1629 CD 8
Dec 96	Fact Sheet, Enviro Progress Newsletter, Edition 13	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1323 CD 6
02 Dec 96	EPA Letter to Base Concerning Final Aviation and Development Center CRP	Hanusiak, Lisa EPA Region IX	1376 CD 6
02 Dec 96	CDTSC Letter to Base Concerning Comments on RI/FS, Draft Final Report, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1631 CD 8
03 Dec 96	EPA Letter to Base Concerning SVE Startup Letter Report for RA, DA-4	Hanusiak, Lisa EPA Region IX	1257 CD 6
03 Dec 96	EPA Letter to Base Concerning Draft SVE-Bioventing Transition Letter Report, Fuel Spill 1	Hanusiak, Lisa EPA Region IX	1258 CD 6
03 Dec 96	City of Atwater Water System Evaluation Scenarios	Boyle Engineering Corp.	1301 CD 6
04 Dec 96	Newspaper Article, "OU-2, Castle Groundwater Treatment Plant Dedicated"	Kayser, Jim The Atwater Signal	1335 CD 6
04 Dec 96	EPA Letter to Base Concerning Revised Verification/Validation Phase II Ecological Risk Assessment Work Plan	Hanusiak, Lisa EPA Region IX	2096 CD 11
11 Dec 96	CDTSC Letter to Base Concerning Review of the Draft QAPP	Ghazi, Rizgar A California Department of Toxic Substances Control	1259 CD 6

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11 Dec 96	CDTSC Memorandum Concerning Review of Part II, Draft SAP for Removal Actions, DA-8, PCB-9, ETC-10	Scruggs, Mary California Department of Toxic Substances Control	1260 CD 6
12 Dec 96	CDTSC Letter to Base Concerning Review of RA, Final Technical Report, Bldg 871	Ghazi, Rizgar A California Department of Toxic Substances Control	1261 CD 6
12 Dec 96	EPA Letter to Base Concerning FFA Schedule Extension for Draft Comprehensive Basewide Report, Part 2	Hanusiak, Lisa Ghazi, Rizgar A EPA Region IX	1778 CD 9
18 Dec 96	RPM Meeting Minutes, 18 Dec 96	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1312 CD 6
18 Dec 96	Meeting Notes, Evaluation of Alternative Pumping Rates for City Wells	McLeod, Campbell Jacobs Engineering Group, Inc.	1356 CD 6
20 Dec 96	Base Letter to EPA Concerning Analytical Laboratories	Matthews, Robert R AFBCA/OL-I	1300 CD 6
31 Dec 96	EPA Letter to Base Concerning Design Letter Report for RA, FT-01	Hanusiak, Lisa EPA Region IX	1262 CD 6
97	Basewide Environmental Baseline Survey (EBS), Supplement, Parcel A	AFBCA/OL-I	1603 CD 8
Jan 97	LTM Sampling Plan, OT-29, OT-30	Jacobs Engineering Group, Inc.	1056 CD 5
Jan 97	Final QPP, Part I HSP, Part II SAP, Part III CQP	Jacobs Engineering Group, Inc.	1267 CD 6

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Jan 97	Fact Sheet, Enviro Fact Sheet, Edition 9	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1317 CD 6
Jan 97	RAB Meeting Minutes, Jan 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1347 CD 6
Jan 97	Final Functional Acceptance Testing Report, OT-30, SD-12	Booz-Allen and Hamilton, Inc.	1420 CD 6
10 Jan 97	CDTSC Letter to Base Concerning Review of Part II Draft SAP for Removal Actions, DA-8, PCB-9, ETC-10	Ghazi, Rizgar A California Department of Toxic Substances Control	1264 CD 6
10 Jan 97	CRWQCB Letter to Base Concerning Demonstration Project Report, Fuel Spill 2	Izzo, Victor J California Regional Water Quality Control Board	1265 CD 6
10 Jan 97	CRWQCB Letter to Base Concerning Comments on Draft SVE-Bioventing Transition Letter Report, SS-017	Izzo, Victor J California Regional Water Quality Control Board	1268 CD 6
10 Jan 97	CRWQCB Letter to Base Concerning Petroleum Only Contaminated Sites	Izzo, Victor J California Regional Water Quality Control Board	1569 CD 8
13 Jan 97	CDTSC Letter to Base Concerning Review of Final ROD, Comprehensive Basewide Groundwater Report, Part 1	Ghazi, Rizgar A California Department of Toxic Substances Control	1781 CD 9
15 Jan 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Preliminary Draft Proposed Plan, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1628 CD 8
16 Jan 97	RPM Meeting Minutes, 16 Jan 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1364 CD 6

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21 Jan 97	EPA Letter to Base Concerning RA, Action Memorandum, ETC-10	Hanusiak, Lisa EPA Region IX	1269 CD 6
25 Jan 97	Press Release, Public Notice, Concerned About Your Communities Future? Attend the Castle RAB Meeting	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1327 CD 6
29 Jan 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on RA, SVE Startup Letter Report, DA-4	Ghazi, Rizgar A California Department of Toxic Substances Control	1619 CD 8
30 Jan 97	EPA Letter to Base Concerning Comments on Phase II Groundwater Treatment System Design Specifications	Hanusiak, Lisa EPA Region IX	1354 CD 6
30 Jan 97	Site Review Meeting Minutes, 30 Jan 97	Marx, Richard Louis Berger & Associates	1577 CD 8
30 Jan 97	Base Letter to CRWQCB Concerning POL Sites	Matthews, Robert R AFBCA/OL-I	1600 CD 8
31 Jan 97	CRWQCB Letter to CDTSC Concerning Performance Based Criteria for Termination of SVE Projects	Izzo, Victor J California Regional Water Quality Control Board	1271 CD 6
31 Jan 97	ROD, Final Comprehensive Basewide, Part I Groundwater	AFBCA/OL-I	1586 CD 8
31 Jan 97	Base Letter to AFCEE Concerning ROD Revisions, SCOU	Matthews, Robert R AFBCA/DB Castle	1779 CD 9
Feb 97	Fact Sheet, Enviro Progress Newsletter, Edition 14	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1324 CD 6

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Feb 97	RAB Meeting Minutes, Feb 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1348 CD 6
03 Feb 97	Base Letter to San Joaquin Valley Concerning Comments on Monitoring Results for Remediation Systems	Matthews, Robert R AFBCA/OL-I	1272 CD 6
03 Feb 97	Base Letter to USFWS and USACE Concerning Invitation to RAB Meeting	Matthews, Robert R AFBCA/OL-I	1275 CD 6
03 Feb 97	CIWMB Letter to CDTSC Concerning Review of Response to Comments on FS, SCOU	Zielinski, Tamara S California Integrated Waste Management Board	1783 CD 9
03 Feb 97	EPA Letter to AFLSA/JACE-WR Concerning Changes to Comprehensive Basewide Final ROD, Part 1	Estrada, Thelma EPA Region IX	1785 CD 9
04 Feb 97	CRWQCB Letter to CDTSC Concerning Response to Agency Comments on RI/FS, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1630 CD 8
04 Feb 97	CRWQCB Letter to CDTSC Concerning Response to Comments on RI/FS, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1784 CD 9
05 Feb 97	Base Letter to RAB Members Concerning Responsiveness Summary to Comprehensive Basewide ROD, Part 1	Matthews, Robert R AFBCA/DB Castle	1786 CD 9
05 Feb 97	EPA Letter to Base Concerning Response to Comments on RI/FS, Draft Final Report, SCOU	Hanusiak, Lisa EPA Region IX	1787 CD 9

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05 Feb 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Outstanding Comments on RI/FS, Draft Final Report, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1788 CD 9
06 Feb 97	SOW, Video Survey School Irrigation Well	AFBCA/OL-I	1353 CD 6
13 Feb 97	EPA and CDTSC Letter to Base Concerning Review of ROD, SCOU	Hanusiak, Lisa Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1626 CD 8
13 Feb 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Performance Based Criteria for Termination of SVE Projects	Ghazi, Rizgar A California Department of Toxic Substances Control	1789 CD 9
19 Feb 97	Summary of Network Model for City of Atwater Water System Report	Boyle Engineering Corp.	1350 CD 6
24 Feb 97	CDTSC Letter to Base Concerning Comments on Phase II, RA, Draft Environmental Cleanup Plan, QPP Addenda	Ghazi, Rizgar A California Department of Toxic Substances Control	1358 CD 6
24 Feb 97	CRWQCB Letter to Base Concerning Request for Extension on Submittal of Work Plan	Izzo, Victor J California Regional Water Quality Control Board	1725 CD 6
25 Feb 97	RPM Meeting Minutes, 25 Feb 97	Matthews, Robert R AFBCA/OL-I	1365 CD 6
27 Feb 97	EPA Letter to Base Concerning Comments on Proposed Sampling Locations, Castle Vista Plume	Hanusiak, Lisa EPA Region IX	1351 CD 6

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27 Feb 97	EPA Letter to Base Concerning Comments on Alternative RA Pilot Study , Density-Driven Convection Pilot Study Plan, Castle Vista Landfill B	Hanusiak, Lisa EPA Region IX	1352 CD 6
Mar 97	Fact Sheet, Enviro Fact Sheet, Edition 10	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1318 CD 6
Mar 97	Slides Concerning Discussion of Site Closure, DA-4	AFBCA/OL-I	1423 CD 6
Mar 97	Final Design Letter Report, DA-8	Jacobs Engineering Group, Inc.	1437 CD 6
06 Mar 97	Base Letter to FAA Concerning FTA-1	Matthews, Robert R AFBCA/OL-I	1276 CD 6
10 Mar 97	CDTSC Memorandum Concerning RI/FS, Comprehensive Basewide Human Health Risk Assessments Part 2	Chernoff, Gerald F California Department of Toxic Substances Control	1790 CD 9
11 Mar 97	EPA Letter to Base Concerning Comments on RPM Draft Meeting Minutes, 25 Feb 97	Hanusiak, Lisa EPA Region IX	1791 CD 9
17 Mar 97	Jacobs Letter to Base Concerning Quarterly Monitoring Program, FS-1	Jacobs Engineering Group, Inc.	1291 CD 6
18 Mar 97	Base Letter to Distribution Concerning FFA Schedule, Request for Extension, SCOU	Matthews, Robert R AFBCA/OL-I	1595 CD 8
18 Mar 97	Project Note 8, Data Gap, DA-8 and PCB-9	Jacobs Engineering Group, Inc.	2097 CD 11

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19 Mar 97	Base Letter to Regulators Concerning Response to Comments on RA, Design Letter Report, FT-001	Matthews, Robert R AFBCA/OL-I	1281 CD 6
19 Mar 97	Base Letter to Regulators Concerning Response to Comments on Draft SVE-Bioventing Transition Letter Report, Fuel Spill 1	Matthews, Robert R AFBCA/OL-I	1282 CD 6
21 Mar 97	EPA Letter to Base Concerning Comments on Phase II, RA, Draft Environmental Cleanup Plan, QPP Addenda	Hanusiak, Lisa EPA Region IX	1357 CD 6
21 Mar 97	EPA and CDTSC Letter to Base Concerning FFA Schedule Extension for Draft Final Proposed Plan, SCOU	Hanusiak, Lisa Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1638 CD 8
24 Mar 97	CDTSC Letter to Base Concerning Comments on RI/FS, Comprehensive Basewide Draft Report, Part II	Ghazi, Rizgar A California Department of Toxic Substances Control	1622 CD 8
24 Mar 97	EPA Letter to Base Concerning RI/FS, Draft Comprehensive Basewide, Part II	Hanusiak, Lisa EPA Region IX	1639 CD 8
24 Mar 97	EPA Letter to Base Concerning Phase II, Comprehensive Basewide Ecological Risk Assessment	Hanusiak, Lisa EPA Region IX	1640 CD 8
26 Mar 97	EPA Letter to Base Concerning Proposal to Reduce Sampling Frequency at Groundwater Treatment Plant, OU-1	Hanusiak, Lisa EPA Region IX	1608 CD 8
27 Mar 97	Newspaper Article, "These Grasses Are Not Meant For Mowing"	McNally, Pat The Merced Sun Star	1338 CD 6

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31 Mar 97	EPA Letter to Base Concerning Draft LTM Sampling Plan, 97 Update	Hanusiak, Lisa EPA Region IX	1614 CD 8
Apr 97	Fact Sheet, Enviro Progress Newsletter, Edition 15	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1424 CD 6
08 Apr 97	CRWQCB Letter to CDTSC Concerning Response to Comments on RI/FS, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1573 CD 8
08 Apr 97	EPA Letter to Base Concerning RA, Draft Final Proposed Plan, SCOU	Hanusiak, Lisa EPA Region IX	1627 CD 8
08 Apr 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Response to Comments on RI/FS, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1632 CD 8
09 Apr 97	RPM Meeting Minutes, 09 Apr 97	Matthews, Robert R AFBCA/OL-I	1366 CD 6
14 Apr 97	CRWQCB Letter to CDTSC Concerning Draft Final Proposed Plan, SCOU	Izzo, Victor J California Regional Water Quality Control Board	1634 CD 8
18 Apr 97	Base Letter to CRWQCB Concerning RA, Design Letter Report, FT-001	Matthews, Robert R AFBCA/OL-I	1454 CD 6
18 Apr 97	CDTSC Letter to Base Concerning Review of Draft Final Proposed Plan, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1558 CD 8
18 Apr 97	CRWQCB Letter to CDTSC Concerning Closure Certification Report Vol II, Closure and Removal of OWS	Izzo, Victor J California Regional Water Quality Control Board	2098 CD 11

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21 Apr 97	EPA Letter to Base Concerning Evaluation of Response to Comments on RI/FS, Draft Final Report, SCOU	Hanusiak, Lisa EPA Region IX	1633 CD 8
22 Apr 97	RPM/TWG Meeting Minutes, 22 Apr 97	Matthews, Robert R AFBCA/OL-I	1367 CD 6
22 Apr 97	RAB Meeting Minutes, 22 Apr 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1368 CD 6
29 Apr 97	EPA Letter to Base Concerning Response to Comments on RA, Design Letter Report, FT-001	Hanusiak, Lisa EPA Region IX	1453 CD 6
May 97	Draft Final Basic Contract QPP	Jacobs Engineering Group, Inc.	967 CD 4
May 97	Phase II, Risk Assessment, Final Environmental Cleanup Plan, QPP Addenda	Jacobs Engineering Group, Inc.	1123 CD 8
May 97	Fact Sheet, Enviro Fact Sheet, Edition 11	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1425 CD 6
May 97	Final Start-Up Letter Report, FT-001	Jacobs Engineering Group, Inc.	1442 CD 6
May 97	RI/FS, Final Report, Part I, Vol I of IX, SCOU	Jacobs Engineering Group, Inc.	1730 CD 6
May 97	RI/FS, Final Report, Part I, Vol II of IX, SCOU	Jacobs Engineering Group, Inc.	1731 CD 8
May 97	RI/FS, Final Report, Part I, Vol III of IX, SCOU	Jacobs Engineering Group, Inc.	1732 CD 7

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May 97	RI/FS, Final Report, Part I, Vol IV of IX, SCOU	Jacobs Engineering Group, Inc.	1733 CD 7
May 97	RI/FS, Final Report, Part I, Vol V of IX, SCOU	Jacobs Engineering Group, Inc.	1734 CD 7
May 97	RI/FS, Final Report, Part I, Vol VI of IX, SCOU	Jacobs Engineering Group, Inc.	1735 CD 7
May 97	RI/FS, Final Report, Part I, Vol VII of IX, SCOU	Jacobs Engineering Group, Inc.	1736 CD 7
May 97	RI/FS, Final Report, Part I, Vol VIII of IX, SCOU	Jacobs Engineering Group, Inc.	1737 CD 7
May 97	RI/FS, Final Report, Part I, Vol IX of IX, SCOU	Jacobs Engineering Group, Inc.	1738 CD 7
May 97	RI/FS, Final Report, Part I, Vol I of III, Appendices, SCOU	Jacobs Engineering Group, Inc.	1739 CD 7
May 97	RI/FS, Final Report, Part I, Vol II of III, Appendices, SCOU	Jacobs Engineering Group, Inc.	1740 CD 7
May 97	RI/FS, Final Report, Part I, Vol III of III, Supplemental Appendices, SCOU	Jacobs Engineering Group, Inc.	1741 CD 7
May 97	RI/FS, Final Baseline Human Health Risk Assessment, Part II, SCOU	Jacobs Engineering Group, Inc.	1742 CD 7
May 97	RI/FS, Final Baseline Human Health Risk Assessment, Part II, Appendices B, C, SCOU	Jacobs Engineering Group, Inc.	1743 CD 8
May 97	RI/FS, Final Report, Part III, SCOU	Jacobs Engineering Group, Inc.	1744 CD 7

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May 97	Jacobs Response to Agency Comments on RI/FS, Final Report, SCOU	Jacobs Engineering Group, Inc.	1745 CD 7
05 May 97	EPA Letter to Base Concerning Comments on Phase II, Draft Final Environmental Cleanup Plan	Hanusiak, Lisa EPA Region IX	1426 CD 6
06 May 97	EPA Letter to Base Concerning Public Comment Period for RA, Further Action Data Gap Sites and Requiring Technical and Economic Evaluations, SCOU	Hanusiak, Lisa EPA Region IX	1637 CD 8
06 May 97	Base Letter to AFCEE Concerning Response to Comments and Preface for RI/FS, Final Report, SCOU	Matthews, Robert R AFBCA/DB Castle	1792 CD 9
07 May 97	Base Letter to Regulators Concerning Response to Comments on Draft Final QAPP	Matthews, Robert R AFBCA/OL-I	1499 CD 6
08 May 97	RPM/TWG Meeting Minutes, 08 May 97	Matthews, Robert R AFBCA/OL-I	1369 CD 6
08 May 97	Remediation Public Meeting Minutes, 08 May 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1370 CD 6
08 May 97	Public Meeting Summary, Castle Vista Groundwater Remediation, 08 May 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1527 CD 6
14 May 97	Base Letter to Distribution Concerning Response to Comments on Phase II, Draft Comprehensive Basewide Ecological Risk Assessment	Matthews, Robert R AFBCA/OL-I	1623 CD 8
16 May 97	Base Memorandum Concerning AM6 and AM17 Sampling Results	Lanning, Todd AFBCA/OL-I	1601 CD 8

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16 May 97	CRWQCB Letter to CDTSC Concerning Comments on RA, Draft Predesign Characterization Report for Groundwater, Castle Vista Landfill B	Russell, John California Regional Water Quality Control Board	1618 CD 8
19 May 97	CDTSC Memorandum Concerning Review of Draft Predesign Characterization Report, Environmental Cleanup Plan, and FSP Addendum for Groundwater RA, Castle Vista Landfill B	Scruggs, Mary California Department of Toxic Substances Control	1617 CD 8
21 May 97	EPA Letter to Base Concerning Draft Closure Certification Report, Vol III, UST and OWS Remediation Program	Hanusiak, Lisa EPA Region IX	1554 CD 8
21 May 97	EPA Letter to Base Concerning ROD, Final, Comprehensive Basewide Groundwater, Part I	Opalski, Daniel D. EPA Region IX	1719 CD 6
24 May 97	Newspaper Article, "Public Notice, Base Environmental Tour and RAB Meeting"	The Merced Sun Star	1407 CD 6
28 May 97	RAB Meeting Minutes, 28 May 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1405 CD 6
28 May 97	RPM Meeting Minutes, 28 May 97	Matthews, Robert R AFBCA/OL-I	1406 CD 6
28 May 97	Proposed Plan, SCOU	AFBCA/OL-I	1435 CD 6
28 May 97	RA, Field Monitoring and Static Rebound	AFBCA/OL-I	1579 CD 8

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29 May 97	EPA Letter to Base Concerning Extension of FFA on Review of Draft Final Basic Contract QPP	Hanusiak, Lisa EPA Region IX	1429 CD 6
Jun 97	Fact Sheet, Enviro Fact Sheet, Edition 12	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1430 CD 6
Jun 97	Fact Sheet, Enviro Progress Newsletter, Edition 16	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1431 CD 6
Jun 97	Final Start-Up Letter Report, DA-8	Jacobs Engineering Group, Inc.	1438 CD 6
Jun 97	In Situ Respiration Test Report, FS-1	Jacobs Engineering Group, Inc.	1441 CD 6
Jun 97	Draft Report to Lawrence Livermore National Laboratory, Risk-Based Remediation of Petroleum, Oils, and Lubricants, Fuel Farm Area	Parsons Engineering Science, Inc.	1443 CD 6
Jun 97	PFFA Intrinsic Remediation Sampling Report	Jacobs Engineering Group, Inc.	1575 CD 8
03 Jun 97	Action Memorandum, Removal Action, Castle Vista Landfills A and B, and Castle Airport Landfills 2 and 4	Jacobs Engineering Group, Inc.	1576 CD 8
05 Jun 97	Base Letter to Regulators Concerning Use, Capping as Final Remedy for Metal and Dioxin Contaminated Soil, FTA-1	Matthews, Robert R AFBCA/OL-I	1459 CD 6
05 Jun 97	EPA Letter to Base Concerning Work Plan Addendum, Proposed Destruction of 20 Monitoring Wells	Hanusiak, Lisa EPA Region IX	1553 CD 8

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09 Jun 97	Base Letter to AFCEE Concerning ROD, Final, Comprehensive Basewide Groundwater, Part I	Matthews, Robert R AFBCA/OL-I	1718 CD 6
11 Jun 97	Base Letter to Regulators Concerning Response to Comments on RA, Design Letter Report, FT-001	Matthews, Robert R AFBCA/OL-I	1452 CD 6
12 Jun 97	Base Letter to Regulators Concerning Response to Comments on Demonstration Project Report, Fuel Spill 2	Matthews, Robert R AFBCA/OL-I	1448 CD 6
12 Jun 97	EPA Letter to Base Concerning Comments on Phase II, RA, Environmental Cleanup Plan, QPP Addenda	Hanusiak, Lisa EPA Region IX	1578 CD 8
16 Jun 97	EPA Letter to Base Concerning Phase II, Comprehensive Basewide Ecological Risk Assessment	Hanusiak, Lisa EPA Region IX	1549 CD 8
17 Jun 97	Base Letter to EPA Concerning State Request for Additional 30 Days to Review Castle Landfill Work Plan	Matthews, Robert R AFBCA/OL-I	1574 CD 8
19 Jun 97	EPA Letter to Base Concerning Response to Comments on Draft SVE-Bioventing Transition Letter Report, Fuel Spill 1	Hanusiak, Lisa EPA Region IX	1552 CD 8
24 Jun 97	RAB Meeting Minutes, 24 Jun 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1408 CD 6
27 Jun 97	Contractor Response to Base Comments on Risk Assessment, PCB-9	Jacobs Engineering Group, Inc.	2099 CD 11
Jul 97	LTM Sampling Plan, LF-34, OT-29, OT-30	Jacobs Engineering Group, Inc.	1054 CD 4

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
Jul 97	Community Relations Plan (CRP), Aviation and Development Center	Gutierrez-Palmenberg, Inc.	1409 CD 6
Jul 97	Fact Sheet, Enviro Progress Newsletter, Edition 17	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1446 CD 6
02 Jul 97	CRWQCB Letter to CDTSC Concerning Comments on RA, Draft Project Activities Work Plan and QPP Addenda, Vol I, SCOU	Russell, John California Regional Water Quality Control Board	1673 CD 8
02 Jul 97	EPA Letter to Base Concerning RA, Draft Action Memorandum, Castle Vista Landfills A and B, Landfills 2 and 4	Hanusiak, Lisa EPA Region IX	1680 CD 8
03 Jul 97	EPA Letter to Base Concerning Predesign Characterization Report and Environmental Cleanup Plan, QPP Addenda for Groundwater RA, Castle Vista Landfill B	Hanusiak, Lisa EPA Region IX	1548 CD 8
03 Jul 97	CRWQCB Letter to CDTSC and Base Concerning Comments on RA Project Activities Work Plan and QPP Addenda, Vol I, SCOU	Russell, John California Regional Water Quality Control Board	1551 CD 8
07 Jul 97	CDTSC Letter to Base Concerning Comments on RA Project Activities Work Plan and QPP Addenda, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1550 CD 8
11 Jul 97	EPA Letter to Base Concerning RA, Draft Final Proposed Plan, SCOU	Hanusiak, Lisa EPA Region IX	1545 CD 8
11 Jul 97	CDTSC Letter to Base Concerning Comments on Phase II, Draft Final Comprehensive Basewide Ecological Risk Assessment	Ghazi, Rizgar A California Department of Toxic Substances Control	1716 CD 6

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14 Jul 97	EPA Letter to Base Concerning Rational and Justification, Capping as Final Remedy for Metals and Dioxin Contaminated Soils, FTA-1	Hanusiak, Lisa EPA Region IX	1451 CD 6
14 Jul 97	EPA Letter to Base Concerning ROD, Preliminary Draft, SCOU	Hanusiak, Lisa EPA Region IX	1546 CD 8
14 Jul 97	EPA Letter to Base Concerning Final Response to Comments on Phase II, RA, Environmental Cleanup Plan, QPP Addenda	Hanusiak, Lisa EPA Region IX	1559 CD 8
14 Jul 97	EPA Letter to Base Concerning Draft Closure Report, DA-4	Hanusiak, Lisa EPA Region IX	1560 CD 8
15 Jul 97	CRWQCB Letter to CDTSC Concerning RA, Action Memorandum, Castle Vista A and B, Landfills 2, 4	Russell, John California Regional Water Quality Control Board	1655 CD 8
15 Jul 97	CDTSC Letter to Base Concerning RA, Action Memorandum, Castle Vista B, Landfills 2 and 4	Ghazi, Rizgar A California Department of Toxic Substances Control	1681 CD 8
17 Jul 97	RPM Meeting Minutes, 25 Jun 97	Matthews, Robert R AFBCA/OL-I	1410 CD 6
17 Jul 97	CRWQCB Letter to CDTSC Concerning Review of Closure Report, DA-4	Izzo, Victor J California Regional Water Quality Control Board	1793 CD 9
19 Jul 97	Newspaper Article, "Public Notice, USAF Announces the Intent to Perform an Excavation at Castle Air Force Base, ETC-10"	The Merced Sun Star	1411 CD 6

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
22 Jul 97	RAB Meeting Minutes, 22 Jul 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1475 CD 6
22 Jul 97	USFWS Letter to Base Concerning Formal Consultation on the Former Skeet Range Remediation Project	White, Wayne S US Fish and Wildlife Service	1636 CD 8
22 Jul 97	Jacobs Response to EPA Comments on RI/FS, Draft Final Report, SCOU	Jacobs Engineering Group, Inc.	1713 CD 6
22 Jul 97	CDTSC Letter to Base Concerning Comments on Closure Report, DA-4	Ghazi, Rizgar A California Department of Toxic Substances Control	1794 CD 9
23 Jul 97	RPM Meeting Minutes, 23 Jul 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1474 CD 6
24 Jul 97	EPA Letter to Base Concerning Draft Final Basic Contract QPP	Hanusiak, Lisa EPA Region IX	1501 CD 6
28 Jul 97	CDTSC Letter to Base Concerning Review of Draft Final Proposed Plan, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	2100 CD 11
30 Jul 97	CDTSC Memorandum Concerning Comments on Draft Closure and Post-Closure Maintenance Plan, Landfills	Scruggs, Mary California Department of Toxic Substances Control	1555 CD 8
30 Jul 97	EPA Letter to Base Concerning Draft Closure and Post-Closure Maintenance Plan, Landfills 2 and 4, Castle Vista Landfills A and B	Hanusiak, Lisa EPA Region IX	1678 CD 8
Aug 97	Phase II, Final Comprehensive Basewide, Ecological Risk Assessment Study	Jacobs Engineering Group, Inc.	1436 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
Aug 97	Draft FSP, DA-8	Jacobs Engineering Group, Inc.	1439 CD 6
Aug 97	Fact Sheet, Enviro Fact Sheet, Edition 13	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1455 CD 6
Aug 97	Update Pages, Draft Final Closure and Post-Closure Maintenance Plan, Landfills 2, 4, Castle Vista A/B. LF-005, LF-007, LF-034	Jacobs Engineering Group, Inc.	2105 CD 11
02 Aug 97	Press Release, Public Notice, USAF Announces a Public Meeting on the CAFB Landfill RA	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1412 CD 6
04 Aug 97	EPA Letter to Base Concerning Addendum QPP, Plant Closures and Storm Drain System Cleanup	Hanusiak, Lisa EPA Region IX	1557 CD 8
06 Aug 97	Jacobs Response to Agency Comments on RA Project Activities Work Plan and QPP Addenda, Vol I, SCOU	Jacobs Engineering Group, Inc.	1714 CD 6
07 Aug 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Draft Closure and Post-Closure Maintenance Plan, Landfills	Ghazi, Rizgar A California Department of Toxic Substances Control	1675 CD 8
08 Aug 97	Base Letter to Regulators Concerning Response to Comments on SVE-Bioventing Transition Letter Report, Fuel Spill 1	Matthews, Robert R AFBCA/OL-I	1447 CD 6
08 Aug 97	EPA Letter to Base Concerning RA, Public Notice Landfill	Hanusiak, Lisa EPA Region IX	1690 CD 8

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
08 Aug 97	CDTSC Letter to Base Concerning Comments on Justification Letter, Cap as Final Remedy for Metal and Dioxin Contaminated Soil, FTA-1	Ghazi, Rizgar A California Department of Toxic Substances Control	1729 CD 6
09 Aug 97	Newspaper Article, "Public Notice, USAF Announces a Public Meeting and Comment Period on the CAFB SCOU Proposed Plan"	The Merced Sun Star	1433 CD 6
12 Aug 97	Newspaper Article, "Public Notice, USAF Announces a Public Meeting on the Castle AFB Landfill RA"	The Merced Sun Star	1434 CD 6
13 Aug 97	Newspaper Article, "Base Cleanup Plan Outlined"	Jones, Gary L The Merced Sun Star	1487 CD 6
14 Aug 97	Base Letter to Regulators Concerning RA, SCOU Project Activities Work Plan, QPP Addenda, Vol I and Closure and Post-Closure Maintenance Plan, Landfill 2, 4, and Castle Vista A/B, LF-005, LF-007, LF-034	Matthews, Robert R AFBCA/DD Castle.	2186 CD 11
15 Aug 97	Newspaper Article, "Castle Joint Power Authority Challenges Air Force to Clean Mess"	Jones, Gary L The Merced Sun Star	1486 CD 6
15 Aug 97	Superfund Site, Proposed Plan, SCOU	Waste Policy Institute	1585 CD 7
16 Aug 97	Newspaper Article, "Time to Unearth Castle Cover-up"	The Merced Sun Star	1485 CD 6
19 Aug 97	Newspaper Article, "Castle Cleanup Plan Finished"	White, Bob The Modesto Bee	1484 CD 6

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19 Aug 97	EPA Letter to Base Concerning RA, Action Memorandum, Castle Vista Landfills A and B, Landfills 2 and 4	Hanusiak, Lisa EPA Region IX	1679 CD 8
19 Aug 97	Project Note 10, Data Gap Soil Gas Survey, LF-4	Jacobs Engineering Group, Inc.	2102 CD 11
20 Aug 97	Base Letter Concerning FFA Schedule, CB Part II, SCOU	Matthews, Robert R AFBCA/OL-I	1612 CD 8
22 Aug 97	Base Letter to Regulators Concerning Response to Comments on Rational and Justification for Capping as Final Remedy for Metal and Dioxin Contaminated Soil, FTA-1	Matthews, Robert R AFBCA/OL-I	1450 CD 6
22 Aug 97	Newspaper Article, "Air Force to Move Landfill"	White, Bob The Modesto Bee .	1480 CD 6
22 Aug 97	Newspaper Article, "Air Force Will Clean Up Castle Landfill"	Jones, Gary L The Merced Sun Star	1481 CD 6
22 Aug 97	CDTSC Letter to Base Concerning CRWQCB Comments on RA, Draft Final Action Memorandum, Castle Vista A and B, Landfills 2 and 4	Ghazi, Rizgar A California Department of Toxic Substances Control	1682 CD 8
25 Aug 97	Newspaper Article, "Castle Cleanup Topic of Hearing"	Jones, Gary L The Merced Sun Star	1476 CD 6
25 Aug 97	MDPH Letter to Base Concerning Comments on the Proposed Cleanup of Soil Contamination	Palsgaard, Jeff H Merced County Department of Public Health	1508 CD 6
26 Aug 97	RAB Meeting Minutes, 26 Aug 97	Gutierrez-Palmenberg, Inc.	1471 CD 6

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26 Aug 97	Public Meeting Transcript, Proposed Plan, SCOU, 26 Aug 97	Barakatt, Sherrie L Barakatt Reporting Service	1523 CD 6
26 Aug 97	Public Meeting Transcript, Proposed Plan, SCOU, 26 Aug 97	Barakatt, Sherrie L Barakatt Reporting Service	1524 CD 6
26 Aug 97	Public Meeting Transcript, Landfill Removal Actions, 26 Aug 97	Barakatt, Sherrie L Barakatt Reporting Service	1525 CD 6
26 Aug 97	Public Meeting Transcript, Landfill Removal Actions, 26 Aug 97	Barakatt, Sherrie L Barakatt Reporting Service	1526 CD 6
27 Aug 97	RPM Meeting Minutes, 27 Aug 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1470 CD 6
27 Aug 97	Newspaper Article, "Public Wants Complete Cleanup of Castle"	Jones, Gary L The Merced Sun Star	1477 CD 6
27 Aug 97	Newspaper Article, "Castle Cleanup Draws Protest"	White, Bob The Modesto Bee	1479 CD 6
28 Aug 97	EPA Letter to Base Concerning Public Notification and Distribution of Proposed Plan, SCOU	Hanusiak, Lisa Ghazi, Rizgar A EPA Region IX California Department of Toxic Substances Control	1456 CD 6
28 Aug 97	Newspaper Article, "Light Shed on Landfill Questions"	Jones, Gary L The Merced Sun Star	1478 CD 6
28 Aug 97	Base Letter to Distribution Concerning Final Response to Comments on Draft Final Basic Contract QPP	Matthews, Robert R AFBCA/OL-I	1621 CD 8

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Sep 97	Fact Sheet, Enviro Progress Newsletter, Edition 18	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1457 CD 6
02 Sep 97	EPA Letter to Base Concerning RA, Action Memorandum, PCB Site 9	Hanusiak, Lisa EPA Region IX	1720 CD 6
04 Sep 97	Base Letter to Regulators Concerning Modifications to Landfill 4 Design, LF-007	Matthews, Robert R AFBCA/DB Castle	1795 CD 9
09 Sep 97	EPA Letter to Base Concerning Draft FSP, SCOU	Hanusiak, Lisa EPA Region IX	1562 CD 8
11 Sep 97	EPA Letter to Base Concerning Remedial Project Activities Draft Final Work Plan and QPP Addenda, Vol I, SCOU	Hanusiak, Lisa EPA Region IX	1672 CD 8
11 Sep 97	EPA Letter to Base Concerning Draft Final Closure and Post-Closure Maintenance Plan, Landfills 2, 4, and Castle Vista A/B	Hanusiak, Lisa EPA Region IX	1677 CD 8
11 Sep 97	EPA Letter to Base Concerning Draft Final Closure and Post-Closure Maintenance Plan, Landfills 2 and 4, Castle Vista Landfills A and B	Hanusiak, Lisa EPA Region IX	1710 CD 6
12 Sep 97	Newspaper Article, "Joint Power Authority Tussles With EPA Over Cleanup"	Jones, Gary L The Merced Sun Star	1473 CD 6
15 Sep 97	Project Note 11, Monitoring Report, FS-1	Jacobs Engineering Group, Inc.	1449 CD 6
15 Sep 97	CRWQCB Letter to CDTSC Concerning Comments on Draft Final Landfill Work Plan and Closure, Post-Closure Maintenance Plan, SCOU	Russell, John California Regional Water Quality Control Board	1676 CD 8

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
17 Sep 97	AFBCA Memorandum Concerning Responsibility for Additional Environmental Cleanup After Transfer of Real Property	Smith, John AFBCA/EVS	1594 CD 8
18 Sep 97	EPA E-mail to Jacobs Concerning Example DQO Table, Bldg 1325	Hanusiak, Lisa EPA Region IX	1580 CD 8
18 Sep 97	EPA Letter to Base Concerning Response to Comments on RA, Design Letter Report, FT-001	Hanusiak, Lisa EPA Region IX	1722 CD 6
19 Sep 97	EPA Letter to Base Concerning Response to Comments on Draft Final Predesign Characterization Report, Environmental Cleanup Plan, QPP Addenda, Groundwater RA, Castle Vista Landfill B	Hanusiak, Lisa EPA Region IX	1723 CD 6
20 Sep 97	Newspaper Article, "Public Notice, Castle RAB Meets Tuesday"	The Merced Sun Star	1467 CD 6
20 Sep 97	Newspaper Article, "Public Notice, USAF Announces an Extension to the Public Comment Period for the SCOU Proposed Plan"	The Merced Sun Star	1643 CD 8
22 Sep 97	City of Atwater Letter to Base Concerning Proposed Plan, SCOU	DeVoe, Kenneth City of Atwater	1469 CD 6
22 Sep 97	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on RA, Draft Final Project Activities Work Plan and QPP Addenda and Closure and Post-Closure Maintenance Plan, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1674 CD 8
23 Sep 97	RAB Meeting Minutes, 23 Sep 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1466 CD 6

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23 Sep 97	Master Program Schedule, Sep Updates	Jacobs Engineering Group, Inc.	1609 CD 8
23 Sep 97	Newspaper Article, "Bill Seeks Better Base Conversions"	The Merced Sun Star	1652 CD 8
23 Sep 97	Base Letter to AFCEE Concerning Response to EPA Comments on RI/FS, Comprehensive Basewide Draft Report, Part II	Matthews, Robert R AFBCA/OL-I	1715 CD 6
24 Sep 97	RPM Meeting Minutes, 24 Sep 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1464 CD 6
24 Sep 97	Newspaper Article, "Castle Cleanup 'Stinks'"	Jones, Gary L The Merced Sun Star	1472 CD 6
24 Sep 97	Draft Agenda for Hydrocarbon Cleanup Demonstration Program Expert Committee Site Visit	AFBCA/OL-I	1598 CD 8
24 Sep 97	Base Letter to AFCEE Concerning ROD Outline, SCOU	Matthews, Robert R AFBCA/OL-I	1703 CD 6
24 Sep 97	Base Letter to AFCEE Concerning RA, Draft Objectives, SCOU	Matthews, Robert R AFBCA/OL-I	1704 CD 6
25 Sep 97	Newspaper Article, "Garbage Dump is Likely to Stay at Castle"	White, Bob The Modesto Bee	1653 CD 8
29 Sep 97	EPA Letter to Base Concerning Draft FSP, DA-8	Hanusiak, Lisa EPA Region IX	1502 CD 6

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29 Sep 97	CDTSC Letter to Base Concerning RI/FS, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1712 CD 6
Oct 97	Final FSP, SCOU	Jacobs Engineering Group, Inc.	1053 CD 4
Oct 97	RA, Final Groundwater Predesign Characterization Report, Part I, Environmental Clean-Up Plan, Part II, LF-34	Jacobs Engineering Group, Inc.	1188 CD 6
Oct 97	Fact Sheet, Enviro Fact Sheet, Edition 14	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1458 CD 6
01 Oct 97	CDTSC Memorandum Concerning Review of Draft FSP, SCOU	Scruggs, Mary California Department of Toxic Substances Control	1625 CD 8
01 Oct 97	Project Note 19, Data Gap Sampling Results, Landfills 1, 3, 4, and 5	Jacobs Engineering Group, Inc.	2103 CD 11
06 Oct 97	CRWQCB Letter to Base Concerning Draft Final Addendum Work Plan, Storm Drain	Russell, John California Regional Water Quality Control Board	1596 CD 8
08 Oct 97	Base Letter to Regulators Concerning Response to Comments on SCOU RA Project Activities Work Plan and Quality Program Plan Addenda, Vol I and Update Pages, Closure and Post-Closure Maintenance Plan	Matthews, Robert R AFBCA/OL-I	2104 CD 11
15 Oct 97	Jacobs Letter to AFCEE Concerning Response to Regulator Comments on Draft FSP, SCOU	Batra, Roger Jacobs Engineering Group, Inc.	1460 CD 6

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15 Oct 97	Jacobs Letter to AFCEE Concerning Response to Agency Comments on Draft FSP, SCOU	Batra, Roger Jacobs Engineering Group, Inc.	1539 CD 8
15 Oct 97	Recommendations for Disposition of ERA Sites	Sjaarda, Nick Jacobs Engineering Group, Inc.	1543 CD 8
17 Oct 97	Base Letter to Regulators Concerning Appendix to RA Project Activities Work Plan and QPP Addenda, Vol I, SCOU	Matthews, Robert R AFBCA/OL-I	1489 CD 6
20 Oct 97	EPA Letter to Base Concerning Ecorisk-Based RA, SCOU	Hanusiak, Lisa EPA Region IX	1582 CD 8
20 Oct 97	Jacobs Letter to AFCEE Concerning Submittal of Table 8-8 for Draft Final Closure and Post Closure Maintenance Plan for Landfills	Loftin, Dean Jacobs Engineering Group, Inc.	1796 CD 9
20 Oct 97	Base Letter to Regulators Concerning Data Gap Sampling Results for Landfills 1, 3, 4, 5	Matthews, Robert R AFBCA/DB Castle	1797 CD 9
25 Oct 97	Newspaper Article, "Public Notice, Castle RAB Meets Tuesday"	The Merced Sun Star	1468 CD 6
28 Oct 97	RAB Meeting Minutes, 28 Oct 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1445 CD 6
29 Oct 97	RPM Meeting Minutes, 29 Oct 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1461 CD 6
29 Oct 97	Base Letter to Distribution Concerning FFA Schedule	Matthews, Robert R AFBCA/OL-I	1611 CD 8

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30 Oct 97	Newspaper Article, "Board Critical of Air Force, EPA Efforts"	Jones, Gary L The Merced Sun Star	1465 CD 6
30 Oct 97	EPA Letter to Base Concerning Response to Comments on Draft Final Basic Contract QPP	Hanusiak, Lisa EPA Region IX	1563 CD 8
Nov 97	Fact Sheet, Enviro Progress Newsletter, Edition 19	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1482 CD 6
04 Nov 97	USFWS Letter to Bureau of Prisons Concerning Formal Consultation on Penitentiary and Landfill Remediation Project	White, Wayne S. US Fish and Wildlife Service	1544 CD 8
05 Nov 97	Base Letter to Regulators Concerning Soil Gas Data, DA-8	Matthews, Robert R AFBCA/OL-I	1498 CD 6
06 Nov 97	Community Relations Meeting Notes, 06 Nov 97	Geissinger, Linda AFBCA/DM	1592 CD 8
10 Nov 97	EPA Letter to Base Concerning Final Groundwater Treatment System O&M Plan, OU-2	Hanusiak, Lisa EPA Region IX	1613 CD 8
12 Nov 97	Bureau of Prisons Letter to Base Concerning Environmental Mitigation, Parcel B	Dorworth, David J Federal Bureau of Prisons	1512 CD 6
12 Nov 97	EPA Letter to Base Concerning Draft Final O&M Plan, Castle Vista Landfill	Hanusiak, Lisa EPA Region IX	1616 CD 8
12 Nov 97	EPA Letter to Base Concerning RA, Elements of Initial Five-Year Review, OU-1	Hanusiak, Lisa EPA Region IX	1620 CD 8

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12 Nov 97	EPA Letter to Base Concerning Phase II, RA, Draft Final O&M Plan	Hanusiak, Lisa EPA Region IX	1624 CD 8
13 Nov 97	Newspaper Article, "Air Force Continues Clean-up at Castle Vista"	Paulson, Michelle The Atwater New Times	1463 CD 6
13 Nov 97	Base Letter to CRWQCB Concerning Foundation Material, Landfill 4	Matthews, Robert R AFBCA/OL-I	1513 CD 6
13 Nov 97	Agency Review Minutes, On-Site Mitigation Proposal, 13 Nov 97	Louis Berger & Associates, Inc.	1606 CD 8
14 Nov 97	Draft Final Airport PFFA Site Assessment Review Letter Report	AFBCA/OL-I	1514 CD 6
14 Nov 97	LLNL Letter to Base Concerning Draft Final Assessment, Adequacy of Available Site Characterization Data of Risk-Based Corrective Action, POL Fuel Farm Area	Rice, David W Lawrence Livermore National Laboratory	1702 CD 6
18 Nov 97	RPM Meeting Minutes, 18 Nov 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1521 CD 6
19 Nov 97	Newspaper Article, "Castle Clean-up a Puzzle"	White, Bob The Modesto Bee	1462 CD 6
19 Nov 97	Data Gap Spreadsheet, RI/FS, Revised Draft Final, SCOU	Jacobs Engineering Group, Inc.	1515 CD 6
20 Nov 97	EPA Letter to Base Concerning Changes to ROD, Comprehensive Basewide Part I, Groundwater	Hanusiak, Lisa EPA Region IX	1605 CD 8

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22 Nov 97	Newspaper Article, "Citizens of Atwater, Winton, Merced: The Castle RAB Meets Tuesday"	The Merced Sun Star	1644 CD 8
25 Nov 97	RAB Meeting Minutes, 25 Nov 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1522 CD 6
26 Nov 97	Newspaper Article, "Castle RAB Meets"	The Atwater Signal	1444 CD 6
Dec 97	Fact Sheet, Enviro Fact Sheet, Edition 15	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1483 CD 6
Dec 97	Draft Closure Report, FS-2	Jacobs Engineering Group, Inc.	1516 CD 6
Dec 97	Draft Closure Report, FS-1	Jacobs Engineering Group, Inc.	1517 CD 6
Dec 97	Final Bioventing Pilot Test Work Plan, PFFA	Parsons Engineering Science, Inc.	1518 CD 6
Dec 97	Final Basic Contract QPP	Jacobs Engineering Group, Inc.	1534 CD 6
Dec 97	Newspaper Article, "Revised Public Notice, Castle AFB Superfund Site Technical Assistance Grant"	The Merced Sun Star	1645 CD 8
01 Dec 97	EPA Letter to US Representative Concerning RAB Issues on Community Involvement	Marcus, Felicia EPA Region IX	1492 CD 6

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
01 Dec 97	EPA Letter to Base Concerning RA, Draft Groundwater Work Plan Addendum, Castle Vista Landfill B	Hanusiak, Lisa EPA Region IX	1615 CD 8
03 Dec 97	EPA Letter to Base Concerning Project Note No. 017, Elimination of Redundant Monitoring Wells	Hanusiak, Lisa EPA Region IX	1610 CD 8
05 Dec 97	EPA Letter to Base Concerning Field Oversight Sampling Report for Landfill B	Hanusiak, Lisa EPA Region IX	1798 CD 9
05 Dec 97	EPA Letter to Base Concerning Recommendation for Ecological Risk Management and Removal Action Completion, ETC-10, SCOU	Hanusiak, Lisa EPA Region IX	1800 CD 9
08 Dec 97	Base Letter to Regulators Concerning SVE Well Destruction, DA-4	Matthews, Robert R AFBCA/OL-I	1493 CD 6
08 Dec 97	Jacobs Letter to AFCEE Concerning Response to Comments on RA, Draft Objectives, SCOU	Watkin, Geoff W Jacobs Engineering Group, Inc.	1726 CD 6
09 Dec 97	Final Site Characterization Letter Report, SD-193	Jacobs Engineering Group, Inc.	1520 CD 6
09 Dec 97	RPM Meeting Minutes, 09 Dec 97	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1530 CD 6
10 Dec 97	Update Pages, RA, Draft Final Appendix to Project Activities Work Plan and QPP Addenda, Vol I, SCOU	Jacobs Engineering Group, Inc.	1490 CD 6
10 Dec 97	Base Letter to Regulators Concerning Final Basic Contract Quality Program Plan	Matthews, Robert R AFBCA/DD Castle	1801 CD 9

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22 Dec 97	Final Field Sampling Oversight Report, Landfill B	Bechtel Environmental, Inc.	1799 CD 9
22 Dec 97	Field Sampling Oversight Report	Bechtel Environmental, Inc.	1804 CD 9
Jan 98	Fact Sheet, Enviro Progress Newsletter, Edition 20	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1496 CD 6
Jan 98	Final BRAC Cleanup Plan (BCP)	Earth Tech, Inc	1536 CD 6
Jan 98	LTM Sampling Program, 97 Annual Report	Jacobs Engineering Group, Inc.	1537 CD 6
05 Jan 98	CDTSC Letter to Base Concerning ROD, Draft, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1500 CD 6
05 Jan 98	HQ USEPA Letter to EPA Region IX Concerning Role of Baseline Risk Assessment in Superfund Remedy Selection Decisions	Clay, Donald R HQ USEPA	1802 CD 9
09 Jan 98	CDTSC Letter to Base Concerning Requirements for Risk Standards, SCOU	Ward, Daniel T California Department of Toxic Substances Control	1780 CD 9
09 Jan 98	Base Letter to CRWQCB Concerning Closure Report, DA-4	Matthews, Robert R AFBCA/DD Castle	1782 CD 9
09 Jan 98	RA, Mid-Term Assessment Report, FT-001	Jacobs Engineering Group, Inc.	1932 CD 10

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12 Jan 98	EPA Letter to Base Concerning Comments on LTM Sampling QAPP	Hanusiak, Lisa EPA Region IX	1503 CD 6
21 Jan 98	EPA Letter to Base Concerning Action Memorandum, RA for PCB	Hanusiak, Lisa EPA Region IX	1491 CD 6
23 Jan 98	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on RA, Draft Groundwater Work Plan Addendum, LF-34	Ghazi, Rizgar A California Department of Toxic Substances Control	1509 CD 6
23 Jan 98	EPA Letter to Base Concerning ROD, Draft, SCOU	Hanusiak, Lisa EPA Region IX	1727 CD 6
24 Jan 98	Newspaper Article, "Public Notice, RAB Meeting"	The Merced Sun Star	1531 CD 6
26 Jan 98	EPA Letter to Base Concerning Comments on Final Basic Contract QPP	Hanusiak, Lisa EPA Region IX	1510 CD 6
27 Jan 98	RAB Meeting Minutes, 27 Jan 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1533 CD 6
28 Jan 98	Newspaper Article, "Public Notice, RA at PCB-9"	The Merced Sun Star	1519 CD 6
28 Jan 98	RPM Meeting Minutes, 28 Jan 98	Gutierrez-Palmenberg, Inc.	1532 CD 6
Feb 98	Draft Closure Report, Final Remedy for Non-VOC Contamination, Vol I, FTA-1	Jacobs Engineering Group, Inc.	1535 CD 6
Feb 98	Fact Sheet, Enviro Fact Sheet, Edition 16	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1540 CD 8

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Feb 98	Draft Final Closure Report, DA-4	Jacobs Engineering Group, Inc.	1758 CD 9
02 Feb 98	EPA Letter to Base Concerning Draft Closure Report, Fuel Spill 2	Hanusiak, Lisa EPA Region IX	1494 CD 6
02 Feb 98	EPA Letter to Base Concerning Draft Closure Report, Fuel Spill 1	Hanusiak, Lisa EPA Region IX	1495 CD 6
05 Feb 98	CDTSC Letter to Base Concerning Comments on ROD, Draft, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1728 CD 6
06 Feb 98	Action Memorandum, Removal Action for PCB, Site 9	Jacobs Engineering Group, Inc.	1803 CD 9
10 Feb 98	Base Letter to Regulators Concerning Basic Contract QPP	Matthews, Robert R AFBCA/DD Castle	1488 CD 6
12 Feb 98	Base Letter to Distribution Concerning Response to Comments on ROD, Draft, SCOU	Matthews, Robert R AFBCA/DD Castle	1541 CD 8
17 Feb 98	EPA Letter to Base Concerning Phase III, Part I, Planned Groundwater Model Update	Hanusiak, Lisa EPA Region IX	1542 CD 8
20 Feb 98	CRWQCB Letter to Base Concerning Comments on Closure Report, FS-1, SS-017	Russell, John California Regional Water Quality Control Board	1529 CD 6
21 Feb 98	Newspaper Article, "RAB Meeting Public Notice"	The Merced Sun Star	1497 CD 6

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24 Feb 98	RAB Meeting Minutes, 24 Feb 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1564 CD 8
25 Feb 98	RPM Meeting Minutes, 25 Feb 98	Gutierrez-Palmenberg, Inc.	1538 CD 8
Mar 98	Fact Sheet, Enviro Progress Newsletter, Edition 21	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1556 CD 8
09 Mar 98	Regulators Letter to Base Concerning Response to Request for a ROD, Second Draft, SCOU	Hanusiak, Lisa Ghazi, Rizgar A Russell, John EPA Region IX California Department of Toxic Substances Control California Regional Water Quality Control Board	1709 CD 6
10 Mar 98	CDTSC Letter to Base Concerning Comments on Draft Final Closure Report, DA-4	Ghazi, Rizgar A California Department of Toxic Substances Control	1717 CD 6
10 Mar 98	CRWQCB Letter to CDTSC Concerning Comments on Draft Final Closure Report, DA-4	Russell, John California Regional Water Quality Control Board	1805 CD 9
10 Mar 98	EPA Letter to Base Concerning Draft Final Closure Report, DA-4	Hanusiak, Lisa EPA Region IX	2107 CD 11
21 Mar 98	Newspaper Article, "Public Notice, Castle RAB Meets"	The Merced Sun Star	1567 CD 8
24 Mar 98	Newspaper Article, "Castle RAB Meets"	The Merced Sun Star	1566 CD 8

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24 Mar 98	RAB Meeting Minutes, 24 Mar 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1591 CD 8
25 Mar 98	RPM Meeting Minutes, 25 Mar 98	Gutierrez-Palmenberg, Inc.	1588 CD 8
25 Mar 98	Consensus Statement on Process to Resolve, DA-4	Tier I Team	2108 CD 11
27 Mar 98	Newspaper Article, "Storms Delay Castle Cleanup"	Jones, Gary L The Merced Sun Star	1565 CD 8
30 Mar 98	EPA Letter to Base Concerning Comments on Draft Final LTM Sampling QAPP Addendum	Hanusiak, Lisa EPA Region IX	1561 CD 8
Apr 98	Final LTM Sampling Program, QAPP Addendum	Jacobs Engineering Group, Inc.	1119 CD 5
Apr 98	Update Pages, Final Closure Report, DA-4	Jacobs Engineering Group, Inc.	1511 CD 6
Apr 98	Fact Sheet, Enviro Fact Sheet, Edition 17	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1568 CD 8
Apr 98	CDTSC Comments on Draft Data Gap Investigation Report, SCOU	California Department of Toxic Substances Control	1760 CD 9
Apr 98	Preservation Area Mitigation and Management Plan, USP	Louis Berger & Associates, Inc.	2109 CD 11
01 Apr 98	Newspaper Article, "RAB Calls for Wastewater Structure Removal"	The Atwater Signal	1590 CD 8

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
06 Apr 98	Base Letter to CDTSC and CRWQCB Concerning Closure Report, SD-12	Matthews, Robert R AFBCA/DD Castle	1570 CD 8
08 Apr 98	Consensus Statement Meeting Minutes, 08 Apr 98	Tier I Team	2110 CD 11
10 Apr 98	EPA Letter to Base Concerning Comments on Data Gap Investigation Draft Report, SCOU	Hanusiak, Lisa EPA Region IX	1571 CD 8
10 Apr 98	EPA Letter to Base Concerning FS, Draft Closure Report, Vol I, FT-001	Hanusiak, Lisa EPA Region IX	1721 CD 6
10 Apr 98	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on FFS/Closure Report, FT-001	Ghazi, Rizgar A California Department of Toxic Substances Control	1806 CD 9
13 Apr 98	CRWQCB Letter to CDTSC Concerning Comments on Data Gap Investigation Draft Report, SCOU	Russell, John California Regional Water Quality Control Board	1572 CD 8
14 Apr 98	Base Letter to Regulators Concerning Reschedule of ROD, Draft Final, SCOU	Matthews, Robert R AFBCA/DD Castle	1686 CD 8
22 Apr 98	EPA Letter to Base Concerning Landfill Corrective Action Plan, Field Oversight Sampling Report, Castle Vista Landfill B	Hanusiak, Lisa EPA Region IX	1711 CD 6
23 Apr 98	EPA Letter to Base Concerning Draft CRP	Hanusiak, Lisa EPA Region IX	1724 CD 6
25 Apr 98	Newspaper Article, "Citizens of Merced County: The Castle RAB Meets Tuesday"	The Merced Sun Star	1646 CD 8

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
27 Apr 98	Newspaper Article, "Castle Cleanup Group Meets"	The Merced Sun Star	1589 CD 8
28 Apr 98	RAB Meeting Minutes, 28 Apr 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1587 CD 8
May 98	Fact Sheet, Enviro Progress Newsletter, Edition 22	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1583 CD 8
May 98	Jacobs Response to EPA Comments on Draft Data Gap Investigation Report, SCOU	Jacobs Engineering Group, Inc.	1687 CD 8
16 May 98	Newspaper Article, "Public Meeting the USAF Invites You to Review and Comment on the Remedies for the Cleanup of Contaminated Soil at the Former Castle AFB"	The Merced Sun Star	1647 CD 8
18 May 98	EPA Letter to Base Concerning LTM Sampling, QAPP Addendum	Hanusiak, Lisa EPA Region IX	1593 CD 8
18 May 98	EPA Letter to Base Concerning Documentation of RA Completion, OT-30, SD-12	Hanusiak, Lisa EPA Region IX	1597 CD 8
19 May 98	Jacobs Letter to EPA Concerning Comments on ROD, Draft, SCOU	Matin, Amir Jacobs Engineering Group, Inc.	1581 CD 8
20 May 98	ROD Public Meeting Minutes, 20 May 98, SCOU	Gutierrez-Palmenberg, Inc.	1669 CD 8
21 May 98	RPM Meeting Minutes, 21 May 98	Gutierrez-Palmenberg, Inc.	1668 CD 8

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Jun 98	ROD, Version III, SCOU	Waste Policy Institute	1113 CD 4
Jun 98	Fact Sheet, Enviro Fact Sheet, Edition 18	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1599 CD 8
Jun 98	EPA Comments on ROD, Version III, SCOU	EPA Region IX	1602 CD 8
Jun 98	Final Data Gap Investigation Report, DA-8, SCOU	Jacobs Engineering Group, Inc.	1700 CD 8
01 Jun 98	EPA Letter to Base Concerning Comments on RA, Draft Final Groundwater Work Plan Addendum, LF-34	Hanusiak, Lisa EPA Region IX	1604 CD 8
12 Jun 98	EPA Letter to Base Concerning Comments on LTM Sampling, Annual and Semiannual Reports	Hanusiak, Lisa EPA Region IX	1607 CD 8
13 Jun 98	Newspaper Article, "Castle Environmental Cleanup Tour, The AFBCA Invites the Public to Take a Tour of the Environmental Sites Being Restored"	The Merced Sun Star	1648 CD 8
15 Jun 98	Newspaper Article, "Agency Holds Cleanup Tour"	The Merced Sun Star	1584 CD 8
16 Jun 98	RAB Meeting Minutes, 16 Jun 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1670 CD 8

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22 Jun 98	CDTSC and CRWQCB Letter to Base Concerning Closure Status, SD-12	Ward, Daniel T Vorster, Antonia K J California Department of Toxic Substances Control California Regional Water Quality Control Board	1635 CD 8
30 Jun 98	RPM Meeting Minutes, 30 Jun 98	Gutierrez-Palmenberg, Inc.	1667 CD 8
Jul 98	LTM Sampling Program, 98 Semiannual Report	Jacobs Engineering Group, Inc.	1671 CD 8
Jul 98	SVE Design Report, Castle Vista Landfill B	Jacobs Engineering Group, Inc.	1693 CD 8
Jul 98	Fact Sheet, Enviro Progress Newsletter, Edition 23	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1694 CD 8
Jul 98	RA, Data Gap Investigation Draft Final Report, Vol II of II, SCOU	Jacobs Engineering Group, Inc.	1924 CD 9
08 Jul 98	Newspaper Article, "Base Hit: Castle Prospers in Post-Air Force Days"	Barnes, Brooks The Wall Street Journal	1657 CD 8
09 Jul 98	TWG Meeting Minutes, 07 Jul 98	Hoge, John Jacobs Engineering Group Inc	1933 CD 10
10 Jul 98	EPA Letter to Base Concerning Remedial Decisions, SCOU, PCB Sites	Hanusiak, Lisa EPA Region IX	1705 CD 6
15 Jul 98	EPA Comments on ROD, Version III, SCOU	Hanusiak, Lisa EPA Region IX	1701 CD 8

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21 Jul 98	EPA Comments on ROD, Version III, SCOU	Hanusiak, Lisa EPA Region IX	1706 CD 6
23 Jul 98	EPA Comments on ROD, Version III, SCOU	Hanusiak, Lisa EPA Region IX	1707 CD 6
24 Jul 98	EPA Comments on ROD Version III, Second Set, SCOU	EPA Region IX	1746 CD 7
25 Jul 98	Newspaper Article, "Attention: The Castle RAB Meets Tuesday"	The Merced Sun Star	1649 CD 8
27 Jul 98	EPA Comments on ROD, Version III, SCOU	Hanusiak, Lisa EPA Region IX	1708 CD 6
28 Jul 98	RPM/TWG Meeting Minutes, 28 Jul 98	Gutierrez-Palmenberg, Inc.	1664 CD 8
28 Jul 98	RAB Meeting Minutes, 28 Jul 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1666 CD 8
29 Jul 98	RPM Meeting Minutes, 29 Jul 98	Gutierrez-Palmenberg, Inc.	1665 CD 8
Aug 98	Draft Final Data Gap Investigation Report, Vol I of II, SCOU	Jacobs Engineering Group, Inc.	1047 CD 5
Aug 98	Draft Final Data Gap Investigation Report, Vol II of II, SCOU	Jacobs Engineering Group, Inc.	1048 CD 8
Aug 98	Fact Sheet, Enviro Fact Sheet, Edition 19	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1747 CD 7

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Aug 98	Closure and Post-Closure Maintenance Plan, Landfills 2, 4, and Castle Vista A/B, LF-005, LF-007, LF-034	Jacobs Engineering Group, Inc.	2187 CD 11
06 Aug 98	EPA Letter to Base Concerning Comments on ROD Version III, SCOU	Hanusiak, Lisa EPA Region IX	1748 CD 7
06 Aug 98	Base Letter to Regulators Concerning ROD, Version III, SCOU	Matthews, Robert R AFBCA/DD Castle	1749 CD 7
07 Aug 98	EPA Letter to Base Concerning RA, Draft Five Year Review, OU-1, OU-2	Hanusiak, Lisa EPA Region IX	1809 CD 9
11 Aug 98	Newspaper Article, "Castle Cleanup Concerns Taken to Colorado"	Jones, Gary L The Merced Sun Star	1658 CD 8
17 Aug 98	Newspaper Article, "Clean Water Still Major Concern"	The Merced Sun Star	1661 CD 8
17 Aug 98	CRWQCB Letter to CDTSC Concerning Review of Version 3 ROD, SCOU	Russell, John California Regional Water Quality Control Board	1808 CD 9
19 Aug 98	EPA Letter to Base Concerning Comments on PCB Draft Closure Report, Site 9	Hanusiak, Lisa EPA Region IX	1807 CD 9
20 Aug 98	Kleinfelder Letter to MDPH Concerning Preliminary Comments on ROD, SCOU	Cook, Dave Kleinfelder, Inc.	1811 CD 9
21 Aug 98	EPA Letter to Base Concerning Obligation for Off-Site Response Actions, Castle Vista Landfill A	Hanusiak, Lisa EPA Region IX	1683 CD 8

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22 Aug 98	Newspaper Article, "The Castle RAB Meets Tuesday"	The Merced Sun Star	1650 CD 8
25 Aug 98	RAB Meeting Minutes, 25 Aug 98	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1663 CD 8
26 Aug 98	Newspaper Article, "Air Force Delays Cleanup Document"	Jones, Gary L The Merced Sun Star	1659 CD 8
26 Aug 98	RPM Meeting Minutes, 25-26 Aug 98	Gutierrez-Palmenberg, Inc.	1662 CD 8
28 Aug 98	CDTSC Letter to Base Concerning Comments on LTM Sampling Program Annual Report, 97	Ghazi, Rizgar A California Department of Toxic Substances Control	1750 CD 7
31 Aug 98	Newspaper Article, "Politicos Conspicuously Absent from Meeting"	Stepp, Lloyd The Merced Sun Star	1660 CD 8
31 Aug 98	CDTSC Letter to Base Concerning Review of PCB-9 Draft Closure Report, SS-048	Ghazi, Rizgar A California Department of Toxic Substances Control	1810 CD 9
Sep 98	Fact Sheet, Enviro Progress Newsletter, Edition 24	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1751 CD 7
Sep 98	Jacobs Revisions to Data Gap Spreadsheet, RI/FS, Draft Final Report, SCOU	Jacobs Engineering Group, Inc.	1753 CD 7
03 Sep 98	EPA Letter to Base Concerning Draft Action Memorandum, LF-04, LF-06	Hanusiak, Lisa EPA Region IX	1752 CD 7

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03 Sep 98	EPA Letter to Base Concerning Review of Draft Action Memorandum for Landfills 1 and 3	Hanusiak, Lisa EPA Region IX	1814 CD 9
04 Sep 98	Base Letter to Regulators Concerning Landfill Public Notice	Matthews, Robert R AFBCA/DD Castle	1815 CD 9
09 Sep 98	CRWQCB Letter to CDTSC Concerning RA, Final Work Plan, LF-34	Russell, John California Regional Water Quality Control Board	1754 CD 7
09 Sep 98	CRWQCB Letter to CDTSC Concerning Review of Landfill Closure Documents	Russell, John California Regional Water Quality Control Board	1819 CD 9
15 Sep 98	Base Letter to EPA Concerning FFA Schedule Modification Request	Jackson, Dale O AFBCA/DD Castle	1812 CD 9
17 Sep 98	CDTSC Letter to Base Concerning Comments on ROD, Version 3, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1813 CD 9
18 Sep 98	CRWQCB Letter to CDTSC Concerning Review of Draft Closure and Post Closure Maintenance Plan, LF-004, LF-006, LF-008	Russell, John California Regional Water Quality Control Board	1820 CD 9
18 Sep 98	EPA Letter to Base Concerning Review of Technical Documents Associated With Removal Actions, LF-004, LF-006, LF-008	Hanusiak, Lisa EPA Region IX	1821 CD 9
23 Sep 98	RPM Meeting Minutes, 22-23 Sep 98	Gutierrez-Palmenberg, Inc.	1641 CD 8

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24 Sep 98	CDTSC Letter to Base Concerning Review of RA, Final Groundwater Work Plan Addendum, LF-34	Ghazi, Rizgar A California Department of Toxic Substances Control	1755 CD 7
29 Sep 98	EPA Letter to Base Concerning Request for FFA Schedule Modification and Extension, SCOU	Smith, Barbara M EPA Region IX	1816 CD 9
29 Sep 98	CDTSC Letter to Base Concerning Review of Draft Action Memorandum, LF-004, LF-006	Ghazi, Rizgar A California Department of Toxic Substances Control	1822 CD 9
Oct 98	Fact Sheet, Enviro Fact Sheet, Edition 20	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1756 CD 7
Oct 98	RA, Risk Based Draft Plan, Fuel Farm Area, ST-33	Parsons Engineering Science, Inc.	1759 CD 9
03 Oct 98	Newspaper Article, "Public Notice, The USAF Announces the Intent to Perform Excavations and On-Site Disposal at Castle AFB"	The Merced Sun Star	1651 CD 8
05 Oct 98	CDTSC Letter to Base Concerning Request for FFA Schedule Modification and Extension, SCOU	Ward, Daniel T Vorster, Antonia K J California Department of Toxic Substances Control	1818 CD 9
05 Oct 98	Base Letter to Regulators Concerning Public Notice for Removal Action, LF-004, LF-006, LF-008	Matthews, Robert R AFBCA/DD Castle	1823 CD 9
05 Oct 98	CDTSC Letter to Base Concerning Review of Landfill Closure Documents, LF-004, LF-006	Ghazi, Rizgar A California Department of Toxic Substances Control	1824 CD 9

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06 Oct 98	Base Letter to Regulators Concerning Extension for Submission of Draft Final CRP	Matthews, Robert R AFBCA/DD Castle	1642 CD 8
16 Oct 98	CRWQCB Letter to EPA Concerning Bechtel Report, Evaluation of Groundwater Remedy, LF-34	Russell, John California Regional Water Quality Control Board	1757 CD 7
19 Oct 98	ATSDR Letter to Base Concerning Public Comments on Public Health Assessment	Howie, Max M, Jr Agency for Toxic Substances and Disease Registry	1825 CD 9
22 Oct 98	CRWQCB Letter to CDTSC Concerning Draft Final Data Gap Investigation Report, SCOU	Russell, John California Regional Water Quality Control Board	1087 CD 4
26 Oct 98	Base Letter to CRWQCB Concerning Foundation Material, Landfill 5	Matthews, Robert R AFBCA/DD Castle	1684 CD 8
26 Oct 98	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Draft Final Data Gap Investigation Report, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1688 CD 8
27 Oct 98	EPA Letter to Base Concerning Comments on Draft Final Data Gap Investigation Report, SCOU	Hanusiak, Lisa EPA Region IX	1689 CD 8
27 Oct 98	RAB Meeting Minutes, 27 Oct 98	Gutierrez-Palmenberg, Inc.	1698 CD 8
27 Oct 98	CDTSC Letter to Base Concerning Review of PCB Draft Final Closure Report and NFA Proposal, SS-048	Landis, Anthony J California Department of Toxic Substances Control	1817 CD 9

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29 Oct 98	EPA Letter to Base Concerning Comments on Draft Final Action Memorandum, LF-004, LF-006, LF-008	Hanusiak, Lisa EPA Region IX	1826 CD 9
Nov 98	Fact Sheet, Enviro Progress Newsletter, Edition 25	Stowe, Russell A Gutierrez-Palmenberg, Inc.	170 CD 2
Nov 98	Final Closure Report, PCB-9	Jacobs Engineering Group, Inc.	1691 CD 8
Nov 98	Draft ETC-10 Closure Report, SS-189	Jacobs Engineering Group, Inc.	1692 CD 8
Nov 98	RA, Final Five Year Review Report	Jacobs Engineering Group, Inc.	1827 CD 9
02 Nov 98	EPA Letter to Base Concerning Review of PCB-9 Draft Final Closure Report, SS-048	Hanusiak, Lisa EPA Region IX	1828 CD 9
04 Nov 98	CRWQCB Letter to CDTSC Concerning Draft Final Action Memorandum, LF-04, LF-06, LF-08	Russell, John California Regional Water Quality Control Board	1064 CD 4
04 Nov 98	Newspaper Article, "Merced Wins Grants"	The Modesto Bee	1654 CD 8
05 Nov 98	CDTSC Letter to Base Concerning Review of Draft Final Action Memorandum, LF-04, LF-06	Ghazi, Rizgar A California Department of Toxic Substances Control	131 CD 2
12 Nov 98	Final Action Memorandum, Landfills 1, 3, 5	AFBCA/DD Castle	1685 CD 8
16 Nov 98	RPM Meeting Minutes, 27-28 Oct 98	Gutierrez-Palmenberg, Inc.	1697 CD 8

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17 Nov 98	EPA Letter to Base Concerning Groundwater Remediation and Municipal Well, LF-34	Hanusiak, Lisa EPA Region IX	769 CD 4
18 Nov 98	RPM Meeting Minutes, 18 Nov 98	Gutierrez-Palmenberg, Inc.	1696 CD 8
20 Nov 98	Jacobs Letter to AFCEE Concerning Surface Cap Maintenance Report, FT-001	Hoge, John Jacobs Engineering Group Inc	1934 CD 10
23 Nov 98	EPA Letter to Base Concerning Comments on Revised Technical Documents for Removal Action, LF-004, LF-006, LF-008	Hanusiak, Lisa EPA Region IX	1829 CD 9
24 Nov 98	EPA Letter to ATSDR Concerning Review of Public Health Assessment	Hanusiak, Lisa EPA Region IX	1830 CD 9
24 Nov 98	Jacobs Letter to AFCEE Concerning RA, Dioxin Sampling Report, FT-001	Sajadi, Mike Jacobs Engineering Group Inc	1935 CD 10
29 Nov 98	Public Health Assessment Study	Agency for Toxic Substances and Disease Registry	1656 CD 8
30 Nov 98	CRWQCB Letter to CDTSC Concerning ROD, Draft Part I, SCOU	Russell, John California Regional Water Quality Control Board	935 CD 3
30 Nov 98	CRWQCB Letter to Base Concerning Transmittal of Order Rescinding Requirements	Vorster, Antonia K J California Regional Water Quality Control Board	1831 CD 9
Dec 98	Fact Sheet, Enviro Fact Sheet, Edition 21	Stowe, Russell A Gutierrez-Palmenberg, Inc.	986 CD 4

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Dec 98	Update Pages, QPP for Removal Action, Part 1 Final HSP, Part 2 Draft SAP, Part 3 Final CQP	Jacobs Engineering Group, Inc.	1832 CD 9
Dec 98	Update Pages, Final Closure and Post-Closure Maintenance Plan, Landfills 1, 3 and 5	Jacobs Engineering Group, Inc.	2112 CD 11
03 Dec 98	EPA Letter to Base Concerning ROD, Draft, Part I, SCOU	Hanusiak, Lisa EPA Region IX	465 CD 3
08 Dec 98	RPM Meeting Minutes, 08 Dec 98	Gutierrez-Palmenberg, Inc.	1695 CD 8
21 Dec 98	CRWQCB Letter to Base Concerning Draft Technical and Economic Evaluation Report	Russell, John California Regional Water Quality Control Board	1833 CD 9
23 Dec 98	EPA Letter to Base Concerning Draft Technical and Economic Evaluation Report	Hanusiak, Lisa EPA Region IX	1834 CD 9
Jan 99	Fact Sheet, Enviro Progress Newsletter, Edition 26	Stowe, Russell A Gutierrez-Palmenberg, Inc.	884 CD 3
Jan 99	LTM Sampling Program, Annual Report 98	Jacobs Engineering Group, Inc.	1699 CD 7
04 Jan 99	EPA Letter to AFBCA/DR Concerning Comments on RA, Draft Final Five Year Review	Opalski, Daniel D EPA Region IX	1835 CD 9
04 Jan 99	Base Letter to Regulators Concerning Final Closure and Post-Closure Maintenance Plan, Landfills 1, 3, and 5	Matthews, Robert R AFBCA/DD Castle	2111 CD 11

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05 Jan 99	Base Letter to Regulators Concerning Request for Extension on ROD, Part I, SCOU	Matthews, Robert R AFBCA/DD Castle	964 CD 4
06 Jan 99	EPA Letter to Base Concerning Review of Draft Final CRP	Hanusiak, Lisa EPA Region IX	1836 CD 9
23 Jan 99	Newspaper Article, "RAB Meeting, 26 Jan 99"	The Merced Sun Star	1870 CD 9
26 Jan 99	RAB Meeting Minutes, 26 Jan 99	Gutierrez-Palmenberg, Inc.	1000 CD 4
26 Jan 99	Base Letter to Regulators Concerning SVE Optimization Efforts for Castle Vista Landfill B, LF-034	Matthews, Robert R AFBCA/DD Castle	1839 CD 9
Feb 99	Fact Sheet, Enviro Fact Sheet, Edition 22	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1176 CD 6
05 Feb 99	Base Letter to Regulators Concerning Excavating Trenches, LF-008	Matthews, Robert R AFBCA/DD Castle	1838 CD 9
11 Feb 99	EPA Letter to Base Concerning Review of Draft QPP, Part 2	Hanusiak, Lisa EPA Region IX	1837 CD 9
19 Feb 99	Tier I/II Meeting Minutes, 27-28 Jan 99	Gutierrez-Palmenberg, Inc.	1207 CD 6
23 Feb 99	CRWQCB Letter to CDTSC Concerning Excavated Soils From OWS, SS-64, LF-07, LF-08	Russell, John California Regional Water Quality Control Board	1385 CD 6
23 Feb 99	EPA Letter to Base Concerning Draft ETC-10 Closure Report, SS-189	Hanusiak, Lisa EPA Region IX	1840 CD 9

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25 Feb 99	Base Letter to Regulators Concerning SVE Optimization Efforts, FTA-1	Matthews, Robert R AFBCA/DD Castle	2113 CD 11
25 Feb 99	Base Letter to Regulators Concerning Excavation at Landfill 5 Trenches	Matthews, Robert R AFBCA/DD Castle	2115 CD 11
Mar 99	Fact Sheet, Enviro Progress Newsletter, Edition 27	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1547 CD 8
Mar 99	Castle Vista Landfill B SVE Start-up Report, LF-034	Jacobs Engineering Group, Inc.	1841 CD 9
04 Mar 99	Base Letter to Regulators Concerning Excavation of Landfill 5 Trenches, LF-008	Matthews, Robert R AFBCA/DD Castle	1842 CD 9
08 Mar 99	ROD, Draft Final, Part I, SCOU	Waste Policy Institute	1118 CD 5
08 Mar 99	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Draft ETC-10 Closure Report, SS-189	Ghazi, Rizgar A California Department of Toxic Substances Control	1843 CD 9
20 Mar 99	Newspaper Article, "RAB Meeting, 23 Mar 99"	The Merced Sun Star	1871 CD 9
22 Mar 99	CRWQCB Letter to Base Concerning Review Comments on Fuel Spill-1 Closure Report, SS-017	Russell, John California Regional Water Quality Control Board	1844 CD 9
22 Mar 99	CRWQCB Letter to CDTSC Concerning Comments on VOC Cleanup Project Report	Russell, John California Regional Water Quality Control Board	1847 CD 9

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23 Mar 99	RAB Meeting Minutes, 23 Mar 99	Gutierrez-Palmenberg, Inc.	1845 CD 9
23 Mar 99	CDTSC Letter to Base Concerning CRWQCB Comments on Soil Tank Removal and Site Restoration Excavation for Bioremediation of Soils	Ghazi, Rizgar A California Department of Toxic Substances Control	1846 CD 9
29 Mar 99	Final Public Health Assessment Study	Agency for Toxic Substances and Disease Registry	842 CD 3
Apr 99	Fact Sheet, Enviro Fact Sheet, Edition 23	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1848 CD 9
Apr 99	Responses to Agency Comments on Draft Final Data Gap Investigation Report, SCOU	Jacobs Engineering Group, Inc.	1852 CD 9
Apr 99	Final QPP for Removal Action, Part 2	Jacobs Engineering Group, Inc.	1865 CD 9
06 Apr 99	CDTSC Letter to Base Concerning Comments on Excavated Soils, SS-64	Ghazi, Rizgar A California Department of Toxic Substances Control	975 CD 5
08 Apr 99	Update Pages, Draft QPP, FT-001, SS-017, SS-018	AFBCA/DD Castle	1849 CD 9
12 Apr 99	EPA Letter to Base Concerning Draft Closure Report, Castle Vista Landfill A and Landfill 2	Hanusiak, Lisa EPA Region IX	1853 CD 9
12 Apr 99	CDTSC Letter to Base Concerning Review of Closure Report for Removal Action at Bldg 785	Landis, Anthony J California Department of Toxic Substances Control	1854 CD 9

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20 Apr 99	EPA Letter to Base Concerning Review of Changes to CRP	Hanusiak, Lisa EPA Region IX	1855 CD 9
21 Apr 99	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Fuel Spill 1 and VOC Cleanup Project	Ghazi, Rizgar A California Department of Toxic Substances Control	1850 CD 9
21 Apr 99	RPM Meeting Minutes, 24 Mar 99	Gutierrez-Palmenberg, Inc.	1851 CD 9
May 99	Fact Sheet, Enviro Progress Newsletter, Edition 28	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1856 CD 9
May 99	Update Pages, Draft Final ETC-10 Removal Action Completion Report, SS-189	Jacobs Engineering Group, Inc.	1860 CD 9
May 99	Update Pages, Draft Final ETC-10 Removal Action Completion Report, SS-189	Jacobs Engineering Group, Inc.	1862 CD 9
May 99	Final Closure Report, Castle Vista Landfill A and Landfill 2, LF-005, LF-034	Jacobs Engineering Group, Inc.	1866 CD 9
04 May 99	EPA Letter to Base Concerning Comments on ROD, Draft Final Part 1, SCOU	Hanusiak, Lisa EPA Region IX	1857 CD 9
06 May 99	CRWQCB Letter to CDTSC Concerning Review of ROD, Draft Final Part 1, SCOU	Russell, John California Regional Water Quality Control Board	1859 CD 9
10 May 99	CDTSC Letter to Base Concerning Review of Closure Report, Castle Vista Landfill A and Landfill 2	Landis, Anthony J California Department of Toxic Substances Control	1864 CD 9

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11 May 99	Base Letter to HQ AFBCA/DD Concerning Information on Environmental Clean-up Actions for Landfill A, LF-034	Floyd, Alice M AFBCA/DD Castle	1867 CD 9
20 May 99	RPM Meeting Minutes, 27 Apr 99	Gutierrez-Palmenberg, Inc.	1858 CD 9
22 May 99	Newspaper Article, "RAB Meeting, 25 May 99"	The Merced Sun Star	1872 CD 9
25 May 99	RAB Meeting Minutes, 25 May 99	Gutierrez-Palmenberg, Inc.	1861 CD 9
Jun 99	Fact Sheet, Enviro Fact Sheet, Edition 24	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1868 CD 9
01 Jun 99	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on ROD, Part 1, SCOU	Ghazi, Rizgar A California Department of Toxic Substances Control	1869 CD 9
10 Jun 99	Base Letter to Regulators Concerning Response to Comments on RA, Risk-Based Plan, ST-033	Matthews, Robert R AFBCA/DD Castle	1907 CD 9
23 Jun 99	EPA Letter to Base Concerning Comments on Draft Final ETC-10 Removal Action Completion Report, SS-189	Hanusiak, Lisa EPA Region IX	1873 CD 9
23 Jun 99	Update Pages, Closure Certification Report, Hazardous Waste Drum Storage Area	Jacobs Engineering Group, Inc.	2116 CD 11
25 Jun 99	EPA Letter to Base Concerning Review of Castle Vista Landfill A and Landfill 2 Draft Final Closure Report	Hanusiak, Lisa EPA Region IX	1863 CD 9

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
25 Jun 99	CDTSC Letter to Base Concerning Closure Certification, Hazardous Waste Drum Storage	Pappas, James M California Department of Toxic Substances Control	2117 CD 11
28 Jun 99	Base Letter to Regulators Concerning Draft Action Memorandum for Firing Range, SS-104	Matthews, Robert R AFBCA/DD Castle	1874 CD 9
Jul 99	Fact Sheet, Enviro Progress Newsletter, Edition 29	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1875 CD 9
Jul 99	Long-Term Groundwater Sampling Program, 99 Semiannual Report	Jacobs Engineering Group, Inc.	1876 CD 9
Jul 99	Final ETC-10 Removal Action Completion Report, SS-189	Jacobs Engineering Group, Inc.	1883 CD 9
Jul 99	Update Pages, Final ETC-10 Removal Action Completion Report, SS-189	Jacobs Engineering Group, Inc.	1893 CD 9
Jul 99	RA, Data Gap Investigation Final Report, Vol I of II, SCOU	Jacobs Engineering Group, Inc.	1923 CD 9
19 Jul 99	EPA Letter to Base Concerning Acceptance of Final Closure Report, Castle Vista Landfill A and Landfill 2, LF-005, LF-034	Hanusiak, Lisa EPA Region IX	1879 CD 9
22 Jul 99	EPA Letter to Base Concerning Response to QA Program Concern on Draft Final ETC-10 Removal Action Completion Report, SS-189	Hanusiak, Lisa EPA Region IX	1877 CD 9
23 Jul 99	RPM Meeting Minutes, 29 Jun 99	Gutierrez-Palmenberg, Inc.	1878 CD 9

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24 Jul 99	Newspaper Article, "Public Notice, Air Force Announces Intent to Perform an Excavation and On-Site Disposal"	The Merced Sun Star	1880 CD 9
24 Jul 99	Newspaper Article, "AFBCA Invites Public to Tour Active Environmental Cleanup Sites"	The Merced Sun Star	1881 CD 9
27 Jul 99	RAB Meeting Minutes, 27 Jul 99	Gutierrez-Palmenberg, Inc.	1882 CD 9
Aug 99	Fact Sheet, Enviro Fact Sheet, Edition 25	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1884 CD 9
Aug 99	Final Closure Report, Fuel Spill 2, SS-018	Jacobs Engineering Group, Inc.	1889 CD 9
04 Aug 99	CDTSC Letter to Base Concerning CDTSC and CRWQCB Comments on Draft Action Memorandum and Project Activities Work Plan, SS-104	Ghazi, Rizgar A California Department of Toxic Substances Control	1899 CD 9
20 Aug 99	RPM Meeting Minutes, 27-28 Jul 99	Gutierrez-Palmenberg, Inc.	1885 CD 9
23 Aug 99	CRWQCB Letter to Base Concerning Review of Final Closure Report for Fuel Spill 2, SS-018	Russell, John California Regional Water Quality Control Board	1886 CD 9
23 Aug 99	Draft Final Action Memorandum, SS-104	Jacobs Engineering Group, Inc.	1887 CD 9
24 Aug 99	CDTSC Letter to Base Concerning Review of Draft Final ETC-10 Removal Action Completion Report, SS-189	Landis, Anthony J California Department of Toxic Substances Control	1888 CD 9

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27 Aug 99	Base Letter to CRWQCB Concerning Foundation Material from Other Remediation Sites, LF-008	Matthews, Robert R AFBCA/DD Castle	1890 CD 9
Sep 99	Fact Sheet, Enviro Progress Newsletter, Edition 30	Stowe, Russell A Gutierrez-Palmenberg, Inc.	1891 CD 9
Sep 99	RA, Project Activities Work Plan, QPP Addenda, Change 2 to Final, SCOU	Jacobs Engineering Group, Inc.	1896 CD 9
07 Sep 99	EPA Letter to Base Concerning Review of Draft Final Action Memorandum, SS-104	Hanusiak, Lisa EPA Region IX	1900 CD 9
13 Sep 99	EPA Letter to Base Concerning Closure of Fuel Spill 2, SS-018	Hanusiak, Lisa EPA Region IX	1892 CD 9
24 Sep 99	CDTSC Letter to Base Concerning Implementation of California Health and Safety Code Section 25157.8, LF-008	Ghazi, Rizgar A California Department of Toxic Substances Control	1898 CD 9
25 Sep 99	Newspaper Article, "RAB Meeting, 28 Sep 99"	The Merced Sun Star	1894 CD 9
27 Sep 99	RPM Meeting Minutes, 25 Aug 99	Gutierrez-Palmenberg, Inc.	1897 CD 9
28 Sep 99	RAB Meeting Minutes, 28 Sep 99	Gutierrez-Palmenberg, Inc.	1901 CD 9
Oct 99	RA, Phase III, Environmental Cleanup Final Plan, Project Activities Work Plan and QPP Addenda	Jacobs Engineering Group, Inc.	1902 CD 9

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
14 Oct 99	CDTSC Letter to Base Concerning Review of Draft Final Action Memorandum and Project Activities Work Plan, SS-104	Ghazi, Rizgar A California Department of Toxic Substances Control	1903 CD 9
14 Oct 99	CDTSC Letter to Base Concerning Comments on Draft Final Action Memorandum and Project Activities Work Plan, SS-104	Ghazi, Rizgar A California Department of Toxic Substances Control	1936 CD 10
15 Oct 99	EPA Letter to Base Concerning Comments on RA, Work Plan, SCOU	Hanusiak, Lisa EPA Region IX	1937 CD 10
18 Oct 99	RPM Meeting Minutes, 29 Sep 99	Gutierrez-Palmenberg, Inc.	1904 CD 9
23 Nov 99	RPM Meeting Minutes, 23 Nov 99	Gutierrez-Palmenberg, Inc.	1905 CD 9
23 Nov 99	RAB Meeting Minutes, 23 Nov 99	Gutierrez-Palmenberg, Inc.	1906 CD 9
30 Nov 99	CRWQCB Letter to Base Concerning Draft Closure and Post-Closure Maintenance Plan Update, LF-007, LF-008	Trommer, Robert California Regional Water Quality Control Board	1895 CD 9
Dec 99	Fact Sheet, Enviro Fact Sheet, Edition 26	Hunt, Julie Gutierrez-Palmenberg, Inc.	1908 CD 9
01 Dec 99	EPA Letter to Base Concerning Comments on Draft Closure and Post-Closure Maintenance Plan Update, LF-007, LF-008	Hanusiak, Lisa EPA Region IX	1910 CD 9
13 Dec 99	EPA Letter to Base Concerning Comments on Operations and Emissions Monitoring of Catalytic Oxidation Units, FT-001	Hanusiak, Lisa EPA Region IX	1938 CD 10

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14 Dec 99	RPM Meeting Minutes, 14 Dec 99	Gutierrez-Palmenberg, Inc.	1909 CD 9
Jan 00	Long-Term Groundwater Sampling Program, 99 Annual Report	Jacobs Engineering Group, Inc.	1912 CD 9
04 Jan 00	CDTSC Letter to Base Concerning Comments on Draft Proposed Plan, SCOU 2	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1939 CD 10
12 Jan 00	CDTSC Letter to Base Concerning Comments on Draft Action Memorandum, SS-051	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1940 CD 10
26 Jan 00	RPM Meeting Minutes, 26 Jan 00	Gutierrez-Palmenberg, Inc.	1911 CD 9
26 Jan 00	Consensus Statement, Bldg 54 Metals Data Gap Resolution	Base Closure Team	1941 CD 10
26 Jan 00	RPM Meeting Minutes, 26 Jan 00	Gutierrez-Palmenberg, Inc.	1942 CD 10
26 Jan 00	SVE Turn-On Criteria Report, SCOU	RPM Members	1943 CD 10
Feb 00	Fact Sheet, Enviro Progress Newsletter, Edition 31	Hunt, Julie Gutierrez-Palmenberg, Inc.	1916 CD 9
18 Feb 00	EPA Letter to Base Concerning Review of Draft Closure Report, LF-004, LF-006, SS-104	Seid, Raymond EPA Region IX	1913 CD 9
22 Feb 00	RAB Meeting Minutes, 22 Feb 00	Gutierrez-Palmenberg, Inc.	1914 CD 9

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
23 Feb 00	RPM Meeting Minutes, 23 Feb 00	Gutierrez-Palmenberg, Inc.	1945 CD 10
Mar 00	Fact Sheet, Enviro Fact Sheet, Edition 27	Hunt, Julie Gutierrez-Palmenberg, Inc.	1915 CD 9
06 Mar 00	EPA Letter to Base Concerning Comments on SVE Decision Study Work Plan, SCOU	Seid, Raymond EPA Region IX	1946 CD 10
09 Mar 00	CRWQCB Letter to Base Concerning Response to Comments on Closure Plan Update, LF-007, LF-008	Russell, John California Regional Water Quality Control Board	1917 CD 9
13 Mar 00	CRWQCB Letter to Base Concerning Review of Closure Report, LF-004, LF-006, SS-104	Russell, John California Regional Water Quality Control Board	1918 CD 9
14 Mar 00	CRWQCB Letter to Base Concerning Review of Draft Action Memorandum for Removal Action, Bldg 54 Group	Russell, John California Regional Water Quality Control Board	1919 CD 9
15 Mar 00	CDTSC Letter to Base Concerning Results of Confirmation Samples at Bldg 1521	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1920 CD 9
28 Mar 00	RPM Meeting Minutes, 28 Mar 00	Gutierrez-Palmenberg, Inc.	1947 CD 10
03 Apr 00	EPA Letter to Base Concerning Review of Draft Action Memorandum for Removal Action, Bldg 54 Group	Seid, Raymond EPA Region IX	1921 CD 9
05 Apr 00	CRWQCB Letter to Base Concerning Review of Excavation Site Draft Documents	Russell, John California Regional Water Quality Control Board	1922 CD 9

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19 Apr 00	CDTSC Letter to Base Concerning Comments on Draft Action Memorandum for Excavation Sites and RA, Project Activities Work Plan, SCOU	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1949 CD 10
20 Apr 00	CRWQCB Letter to Base Concerning Comments on Draft SVE Decision Study Work Plan	Russell, John California Regional Water Quality Control Board	1950 CD 10
25 Apr 00	EPA Letter to Base Concerning Comments on the Draft Action Memorandum	Seid, Raymond EPA Region IX	1951 CD 10
28 Apr 00	CRWQCB Letter to Base Concerning Comments on Action Memorandum	Russell, John California Regional Water Quality Control Board	1952 CD 10
May 00	Final Action Memorandum	Montgomery Watson Americas, Inc	1953 CD 10
01 May 00	EPA Letter to Base Concerning Comments on RA, Project Activities Work Plan and Quality Program Plan Addenda, SCOU	Seid, Raymond EPA Region IX	1954 CD 10
05 May 00	CDTSC Letter to Base Concerning Comments on Draft SVE Decision Study Work Plan	California Department of Toxic Substances Control	1955 CD 10
08 May 00	EPA Letter to Base Concerning Comments on Work Plan and Quality Program Plan	Seid, Raymond EPA Region IX	1956 CD 10
22 May 00	CDTSC Letter to Base Concerning Comments on Draft Final Action Memorandum	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1957 CD 10

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22 May 00	CDTSC Letter to Base Concerning Comments on Draft Work Plan and Quality Program Plan	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1958 CD 10
22 May 00	RPM Meeting Minutes, 22 May 00	Gutierrez-Palmenberg, Inc.	1959 CD 10
23 May 00	RAB Meeting Minutes, 23 May 00	Gutierrez-Palmenberg, Inc.	1962 CD 10
24 May 00	EPA Letter to Base Concerning Comments on Action Memorandum	Seid, Raymond EPA Region IX	1963 CD 10
05 Jun 00	Ecological Risk Assessment Disposition Meeting Minutes, 09 Oct 97	Jacobs Engineering Group, Inc.	2118 CD 11
12 Jun 00	EPA Letter to Base Concerning Comments on Action Memorandum For Excavation of Contaminated Soils at Four Sites	Meer, Daniel A EPA Region IX	1964 CD 10
15 Jun 00	EPA Letter to Base Concerning Comments on Draft Closure Report, LF-034	Seid, Raymond EPA Region IX	1965 CD 10
21 Jun 00	RPM Meeting Minutes, 21 Jun 00	Gutierrez-Palmenberg, Inc.	1966 CD 10
22 Jun 00	EPA Letter to Base Concerning Comments on RA, Project Activities Work Plan, SCOU and Quality Program Plan Addenda, Vol 1, Change 3 to Final	Seid, Raymond EPA Region IX	1967 CD 10
28 Jun 00	EPA Letter to Base Concerning Comments on Removal Action Completion Report, LF-004, LF-006, SS-104	Seid, Raymond EPA Region IX	1968 CD 10

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29 Jun 00	EPA Letter to Base Concerning Comments on Work Plan and Quality Program Plan for Removal Actions for Six Sites	Seid, Raymond EPA Region IX	1969 CD 10
30 Jun 00	CDTSC Letter to Base Concerning Comments on Removal Action, FT-001	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1970 CD 10
Jul 00	RA, Final Project Activities Work Plan for Petroleum Hydrocarbon Contaminated Sites, SCOU	Jacobs Engineering Group, Inc.	1960 CD 10
Jul 00	Final Action Memorandum for CERCLA Excavation Sites	Jacobs Engineering Group, Inc.	1961 CD 10
Jul 00	Final Data Evaluation Report, FT-001	Praxis Environmental Technologies, Inc	1971 CD 10
Jul 00	Final Data Evaluation Report, SD-012	Praxis Environmental Technologies, Inc	1972 CD 10
Jul 00	Long Term Groundwater Sampling Program, 00 Semiannual Report	Versar, Inc.	1973 CD 10
Jul 00	Closure and Post Closure Maintenance Plan Update, LF-007, LF-008	Jacobs Engineering Group, Inc.	1974 CD 10
Jul 00	Final Closure Report, LF-034	Jacobs Engineering Group, Inc.	1986 CD 10
Jul 00	Ecological Assessment Report, Landfill 5	Louis Berger & Associates, Inc.	2119 CD 11

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11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Final Excavation Documents	Russell, John California Regional Water Quality Control Board	1975 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Final Closure and Post Closure Maintenance Plan Update, LF-007, LF-008	Russell, John California Regional Water Quality Control Board	1976 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Final Removal Action Completion Report, LF-004, LF-006, SS-104	Russell, John California Regional Water Quality Control Board	1977 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Closure Report, LF-034	Russell, John California Regional Water Quality Control Board	1978 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Final Action Memorandum and Draft Final Work Plan and Quality Program Plan	Russell, John California Regional Water Quality Control Board	1979 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Final Closure Report, SS-017	Russell, John California Regional Water Quality Control Board	1980 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Intrinsic Remediation Documents	Russell, John California Regional Water Quality Control Board	1981 CD 10
11 Jul 00	CRWQCB Letter to Base Concerning Comments on Draft Final SVE Decision Study Work Plan	Russell, John California Regional Water Quality Control Board	1982 CD 10
18 Jul 00	RPM Meeting Minutes, 18 Jul 00	Gutierrez-Palmenberg, Inc.	1983 CD 10

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
24 Jul 00	CDTSC Letter to Base Concerning Comments on Draft Memorandums for Excavation Sites	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1984 CD 10
24 Jul 00	CDTSC Letter to Base Concerning Comments on Draft Closure Report, LF-034	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1985 CD 10
Aug 00	Fact Sheet, Enviro Progress Newsletter, Edition 34	AFBCA/DD Castle	1987 CD 10
Aug 00	Final Work Plan and Quality Program Plan for Bldg 54 Group Removal Action Project	Montgomery Watson Americas, Inc	1988 CD 10
Aug 00	Removal Action Completion Report, LF-004, LF-006, SS-104	Jacobs Engineering Group, Inc.	1989 CD 10
02 Aug 00	CDTSC Letter to Base Concerning Comments on Draft Removal Action Completion Report, LF-004, LF-006, SS-104	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1990 CD 10
02 Aug 00	CDTSC Letter to Base Concerning Comments on Draft Final Closure and Post Closure Maintenance Plan Update, LF-007, LF-008	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1991 CD 10
03 Aug 00	Base Letter to Regulators Concerning Comments on BCT Meeting Minutes, 17 Jul 00	Lanning, Todd AFBCA/DD Castle	1992 CD 10
09 Aug 00	CRWQCB Letter to Base Concerning Comments on Draft Closure Report, SD-016, WP-041	Russell, John California Regional Water Quality Control Board	1993 CD 10

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18 Aug 00	EPA Letter to Base Concerning Comments on Draft Final SVE Decision Study Work Plan, SCOU	Seid, Raymond EPA Region IX	1994 CD 10
23 Aug 00	RPM Meeting Minutes, 23 Aug 00	Gutierrez-Palmenberg, Inc.	1996 CD 10
24 Aug 00	EPA Letter to Base Concerning Comments on Final Closure Report, LF-034	Seid, Raymond EPA Region IX	1995 CD 10
28 Aug 00	CDTSC Letter to Base Concerning Comments on Draft Final SVE Decision Study Work Plan	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1997 CD 10
31 Aug 00	CDTSC Letter to Base Concerning Comments on Draft Final Work Plan and Quality Program Plan, SS-054	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	1998 CD 10
Sep 00	Final SVE Decision Study Work Plan, SCOU	Earth Tech, Inc	1999 CD 10
Sep 00	Final Closure Report, LF-034	Jacobs Engineering Group, Inc.	2000 CD 10
06 Sep 00	CDTSC Letter to Base Concerning Comments on Final Closure Report, LF-034	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2001 CD 10
06 Sep 00	CDTSC Letter to Base Concerning Comments on CERCLA Draft Closure Report for VOC Contamination, SD-016, WP-041	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2002 CD 10
26 Sep 00	CRWQCB Letter to Base Concerning Comments on CERCLA Closure Report for VOC Contamination, SD-016, WP-041	Austin, Duncan California Regional Water Quality Control Board	2003 CD 10

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Oct 00	Fact Sheet, Enviro Progress Newsletter, Edition 35	AFBCA/DD Castle	2004 CD 10
Oct 00	Earth Tech Response to CRWQCB Comments on Revised Draft Proposed Plan, SCOU	Earth Tech, Inc	2005 CD 10
Oct 00	Earth Tech Response to CDTSC Comments on Revised Draft Proposed Plan, SCOU	Earth Tech, Inc	2006 CD 10
Oct 00	Earth Tech Response to EPA Comments on Revised Draft Proposed Plan, SCOU	Earth Tech, Inc	2007 CD 10
10 Oct 00	CRWQCB Letter to Base Concerning Comments on Work Plan for Collecting Additional Soil Samples, SD-199, SD-200, SD-206	Austin, Duncan California Regional Water Quality Control Board	2008 CD 10
11 Oct 00	Pulsing Assessment Report, FT-001	Jacobs Engineering Group, Inc.	2009 CD 10
13 Oct 00	Project Note 164, Implementation of SVE Report, Bldg 325	Jacobs Engineering Group, Inc.	2120 CD 11
17 Oct 00	CDTSC Letter to San Joaquin Valley APCD Concerning Comments on Request for ARAR's, SCOU	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2010 CD 10
23 Oct 00	CRWQCB Letter to Base Concerning Comments on Request for Authorization to Close Excavation, FT-003	Austin, Duncan California Regional Water Quality Control Board	2011 CD 10
25 Oct 00	CIWMB Letter to CDTSC Concerning Comments on Request for ARAR's, SCOU	Graber, Jacques California Integrated Waste Management Board	2012 CD 10

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25 Oct 00	CDTSC Letter to Base Concerning Comments on Draft Closure Report for CERCLA and Petroleum Hydrocarbon-Contaminated Excavation/Disposal Sites	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2013 CD 10
30 Oct 00	CRWQCB Letter to Base Concerning Comments on Draft Closure Report for CERCLA and Petroleum Hydrocarbon-Contaminated Excavation/Disposal Sites	Austin, Duncan California Regional Water Quality Control Board	2014 CD 10
30 Oct 00	CRWQCB Letter to CDTSC Concerning Comments on Request for ARAR, SCOU	Austin, Duncan California Regional Water Quality Control Board	2015 CD 10
Nov 00	SVE Decision Study for Data Report, SCOU	Earth Tech, Inc	2016 CD 10
01 Nov 00	Base Letter to Regulators Concerning Comments on TWG Meeting Minutes, 26 Sep 00	Lanning, Todd AFBCA/DD Castle	2017 CD 10
07 Nov 00	EPA Letter to Base Concerning Comments on Draft Closure Report for CERCLA and Petroleum Hydrocarbon-Contaminated Excavation/Disposal Sites	Seid, Raymond EPA Region IX	2018 CD 10
07 Nov 00	Base Letter to CDBEO Concerning Comments on Site Selected Alternative Map, SCOU	Lanning, Todd AFBCA/DD Castle	2021 CD 10
09 Nov 00	San Joaquin Valley APCD Letter to CDTSC Concerning Comments on Air Quality Requirements for RA	Sadredin, Seyed San Joaquin Valley Air Pollution Control District	2019 CD 10

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13 Nov 00	EPA Letter to Base Concerning Comments on Draft Technical Memorandum for Re-evaluation of Risk Assessment, SD-045	Seid, Raymond EPA Region IX	2020 CD 10
14 Nov 00	EPA Letter to Base Concerning Comments on SVE, SS-064	Seid, Raymond EPA Region IX	2022 CD 10
20 Nov 00	EPA Letter to Base Concerning Comments on CERCLA Closure Report for VOC Contamination, SD-016, WP-041	Seid, Raymond EPA Region IX	2023 CD 10
20 Nov 00	Requisition and Invoice/Shipping Document	AFBCA/DD Castle	2024 CD 10
27 Nov 00	CDTSC Letter to Base Concerning Comments on Draft Final CERCLA Closure Report for VOC Contamination, SD-016, WP-041	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2025 CD 10
28 Nov 00	RAB Meeting Minutes, 28 Nov 00	Gutierrez-Palmenberg, Inc.	2026 CD 10
29 Nov 00	RPM Meeting Minutes, 29 Nov 00	Gutierrez-Palmenberg, Inc.	2027 CD 10
30 Nov 00	Technical Memorandum Report, Re-evaluation of Risk Assessment, SD-045	AFBCA/DD Castle	2030 CD 10
Dec 00	Final Closure Report, CERCLA and Petroleum Hydrocarbon-Contaminated Excavation Sites	Jacobs Engineering Group, Inc.	1944 CD 10
Dec 00	Final Closure Report, SS-017	Jacobs Engineering Group, Inc.	2028 CD 10

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Dec 00	Final CERCLA Closure Report for VOC Contamination, SD-016, WP-041	Jacobs Engineering Group, Inc.	2029 CD 10
11 Dec 00	CRWQCB Letter to Base Concerning Comments on Draft Revised Proposed Plan, SCOU	Austin, Duncan California Regional Water Quality Control Board	2031 CD 10
12 Dec 00	EPA Letter to Base Concerning Comments on Draft Proposed Plan, SCOU	Seid, Raymond EPA Region IX	2032 CD 10
22 Dec 00	CRWQCB Letter to Base Concerning Comments on SVE, SS-064	Austin, Duncan California Regional Water Quality Control Board	2033 CD 10
08 Jan 01	CRWQCB Letter to Base Concerning Comments on Draft Action Memorandum	Austin, Duncan California Regional Water Quality Control Board	2034 CD 10
10 Jan 01	RPM Meeting Minutes, 10 Jan 01	Gutierrez-Palmenberg, Inc.	2035 CD 10
22 Jan 01	CDTSC Letter to Base Concerning Comments on Request for Extension on ROD, Draft Final Part 1, SCOU	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2036 CD 10
22 Jan 01	EPA Letter to Base and CDTSC Concerning Comments on ROD, Part 1, SCOU	Seid, Raymond EPA Region IX	2037 CD 10
24 Jan 01	TWG Meeting Minutes, 09 Jan 01	Jacobs Engineering Group, Inc.	2044 CD 10
29 Jan 01	CDTSC Letter to Base Concerning Comments on Phase II/III, RA, Draft Interim Report	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2038 CD 10

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Feb 01	Fact Sheet, Enviro Fact Sheet, Edition 29	AFBCA/DD Castle	2039 CD 10
Feb 01	Long Term Groundwater Sampling Program, 00 Annual Report	Versar, Inc.	2040 CD 10
Feb 01	Revised Proposed Plan, SCOU	AFBCA/DD Castle	2042 CD 10
05 Feb 01	EPA Letter to Base Concerning Comments on Draft Action Memorandum	Seid, Raymond EPA Region IX	2041 CD 10
06 Feb 01	EPA Letter to Base Concerning Comments on Draft Action Memorandum, SS-086, SD-013	Seid, Raymond EPA Region IX	2043 CD 10
06 Feb 01	Base Letter to Regulators Concerning Comments on Disposition of ERA Sites	Lanning, Todd AFBCA/DD Castle	2045 CD 10
12 Feb 01	EPA Letter to Base Concerning Comments on ROD, Part 1, SCOU	Seid, Raymond EPA Region IX	2046 CD 10
13 Feb 01	CRWQCB Letter to Base Concerning Comments on ROD, Draft Final Part 1, SCOU	Austin, Duncan California Regional Water Quality Control Board	2047 CD 10
13 Feb 01	CDTSC Letter to Base Concerning Comments on ROD, Part 1, SCOU	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2048 CD 10
27 Feb 01	RAB Meeting Minutes, 27 Feb 01	Gutierrez-Palmenberg, Inc.	2121 CD 11
05 Mar 01	EPA Letter to Base Concerning Comments on Ecological Work Plan	Seid, Raymond EPA Region IX	2049 CD 10

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07 Mar 01	USFWS Letter to Base Concerning Comments on Amendment to Biological Opinion, Remediation Project, SS-189	Goude, Cay C US Fish and Wildlife Service	2050 CD 10
13 Mar 01	CRWQCB Letter to Base Concerning Comments on Draft Action Memorandum, SD-013, SS-086	Austin, Duncan California Regional Water Quality Control Board	2051 CD 10
13 Mar 01	CRWQCB Letter to Base Concerning Comments on Revised Draft Letter Work Plan, SS-112, Revised Draft Final Letter Work Plan, SS-089 and Letter Excavation Work Plan, SS-069	Austin, Duncan California Regional Water Quality Control Board	2052 CD 10
13 Mar 01	Regulators Letter to Base Concerning Comments on State's Position on Proposed Remedy, LF-034	Tatoian Cain, Carolyn V Austin, Duncan California Department of Toxic Substances Control California Regional Water Quality Control Board	2053 CD 10
14 Mar 01	CDTSC Letter to Base Concerning Comments on Final Revised Proposed Plan, SCOU 2	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2054 CD 10
15 Mar 01	CDTSC Letter to Base Concerning Comments on Draft Ecological Work Plan	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2055 CD 10
20 Mar 01	Mitretek Systems Letter to Base Concerning Comments on TWG and BCT Meeting Minutes, 27 Feb 01	Casagrande, Daniel J Mitretek Systems	2056 CD 10
27 Mar 01	CDTSC Letter to Base Concerning Comments on Draft Action Memorandum, SD-013, SS-086	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2057 CD 10

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Apr 01	Evaluation of Changes Affecting the SCOU Baseline Human Health Risk Assessment Study, Selected Remedies and RA Objectives	Jacobs Engineering Group, Inc.	2072 CD 10
03 Apr 01	CDTSC Letter to Base Concerning Comments on Draft Final Action Memorandum	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2058 CD 10
03 Apr 01	Ecological Work Plan	Jacobs Engineering Group, Inc.	2059 CD 10
09 Apr 01	CRWQCB Letter to Base Concerning Comments on Draft Final Action Memorandum	Austin, Duncan California Regional Water Quality Control Board	2060 CD 10
16 Apr 01	Base Letter to Regulators Concerning Comments on ROD, Part 1, SCOU	Lanning, Todd AFBCA/DD Castle	2061 CD 10
17 Apr 01	EPA Letter to Base Concerning Comments on Draft Work Plan and Design Basis Report	Seid, Raymond EPA Region IX	2062 CD 10
18 Apr 01	EPA Letter to Base Concerning Comments on Phase II/III, RA, Interim Report for Groundwater Extraction and Treatment Systems	Seid, Raymond EPA Region IX	2063 CD 10
24 Apr 01	Base Letter to CRWQCB Concerning Comments on Conversion of SVE System to Bioventing, SS-187	Lanning, Todd AFBCA/DD Castle	2064 CD 10
25 Apr 01	Letter Work Plan, Soil Vapor Monitoring/Extraction Well Installation, JP-7	Montgomery Watson	2065 CD 10
26 Apr 01	EPA Letter to Base Concerning Comments on Draft Final Action Memorandum for Removal Action Project	Meer, Daniel A EPA Region IX	2066 CD 10

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
30 Apr 01	CDTSC Letter to Base Concerning Comments on Revised Draft Final Action Memorandum	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2067 CD 10
May 01	Final Action Memorandum	Montgomery Watson Americas, Inc	2068 CD 10
01 May 01	CDTSC Letter to Base Concerning Comments on Supplemental EBS and FOSL	Phillippe, Stanley R California Department of Toxic Substances Control	2069 CD 10
03 May 01	EPA Letter to Base Concerning Comments on Draft Final Action Memorandum, SD-013, SS-086	Seid, Raymond EPA Region IX	2070 CD 10
04 May 01	CRWQCB Letter to Base Concerning Comments on Draft Work Plan and Design Basis Report	Austin, Duncan California Regional Water Quality Control Board	2071 CD 10
09 May 01	Base Letter to San Joaquin Valley APCD Concerning Comments on SVE	Lanning, Todd AFBCA/DD Castle	2073 CD 10
09 May 01	EPA Letter to Base Concerning Comments on Draft Work Plan and Design Basis Report, SD-013, SS-086	Seid, Raymond EPA Region IX	2074 CD 10
14 May 01	San Joaquin Valley APCD Letter to Base Concerning Comments on Air Quality Requirements for RAs	Swaney, Jim San Joaquin Valley Air Pollution Control District	2075 CD 10
14 May 01	CRWQCB Letter to Base Concerning Comments on Draft Final Action Memorandum, SD-013, SS-086	Austin, Duncan California Regional Water Quality Control Board	2076 CD 10

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15 May 01	EPA Letter to Base Concerning Comments on Draft Final Action Memorandum, SD-013, SS-086	Meer, Daniel A EPA Region IX	2077 CD 10
21 May 01	Base Letter to Regulators Concerning Request for Schedule Extension on ROD, Part I, SCOU	Lanning, Todd AFBCA/DD Castle	2078 CD 10
22 May 01	Certificate of Clearance Report	93 CES/CEV	2122 CD 11
25 May 01	Base Letter to Regulators Concerning Comments on Revised Proposed Plan Responsiveness Summary, SCOU	Lanning, Todd AFBCA/DD Castle	2079 CD 10
30 May 01	Final Wetlands Work Plan	Earth Tech, Inc	2080 CD 10
31 May 01	CRWQCB Letter to Base Concerning Comments on Draft Work Plan and Design Basis Report, SD-013, SS-086	Austin, Duncan California Regional Water Quality Control Board	1948 CD 10
07 Jun 01	Base Letter to Regulators Concerning Conversion of SVE System From Catalytic Oxidation to Granular Activated Carbon Treatment, FTA-1	Lanning, Todd AFBCA/DD Castle	2123 CD 11
08 Jun 01	BCT Meeting Minutes, 28 Mar 01	AFBCA/DD Castle	2124 CD 11
15 Jun 01	CDTSC Letter to Base Concerning Draft Final Action Memorandum, Removal Action, Bldg 1350, Bldg 1762 and DA-5	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2125 CD 11
20 Jun 01	EPA Letter to Base Concerning Project Note 165, SVE at Bldg 551	Seid, Raymond EPA Region IX	2126 CD 11

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20 Jun 01	USFWS Letter to Base Concerning Evaluation of Wetlands Final Work Plan	Knight, Jan C US Fish and Wildlife Service	2127 CD 11
21 Jun 01	EPA Letter to Base Concerning Project Note 166, SVE at FTA-3	Seid, Raymond EPA Region IX	2128 CD 11
21 Jun 01	CDTSC Letter to Base Concerning Draft Work Plans and Design Basis Reports	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2129 CD 11
25 Jun 01	RAB Meeting Minutes, 22 May 01	Montgomery Watson	2130 CD 11
25 Jun 01	EPA Letter to Base Concerning Letter Work Plan for Installing SV Monitoring/Extraction Well, JP-7	Seid, Raymond EPA Region IX	2131 CD 11
26 Jun 01	CDTSC Letter to Base Concerning Final Closure Report for CERCLA and Petroleum Hydrocarbon Contaminated Excavation/Disposal Sites	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2132 CD 11
02 Jul 01	CDTSC Letter to Base Concerning Final Wetlands Work Plan	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2133 CD 11
09 Jul 01	CRWQCB Letter to Base Concerning Revised Letter Work Plan for Soil Vapor Monitoring/Extraction Well Installation	Austin, Duncan California Regional Water Quality Control Board	2134 CD 11
17 Jul 01	Base Letter to Regulators Concerning Response to Comments on the Letter Work Plan for SV Monitoring/Extraction Well, JP-7	Lanning, Todd AFBCA/DD Castle	2136 CD 11

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18 Jul 01	Base Letter to FBP Concerning Wetlands and Vernal Pool Coordination/Support	Lanning, Todd AFBCA/DD Castle	2137 CD 11
23 Jul 01	RPM Meeting Minutes, 23 May 01	Montgomery Watson	2135 CD 11
23 Jul 01	CDTSC Letter to Base Concerning Draft FFS, Final Remedy for Non-VOC Contamination, Vol 1, FTA-1	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2138 CD 11
Aug 01	Long-Term Groundwater Sampling Program, Semiannual Report 01	Jacobs Engineering Group, Inc.	2139 CD 11
01 Aug 01	Final RPM Meeting Minutes, 28 Jun 01	Montgomery Watson Harza	2140 CD 11
13 Aug 01	CRWQCB Letter to Base Concerning FFS, FTA-1	Austin, Duncan California Regional Water Quality Control Board	2141 CD 11
Oct 01	RPM Meeting Minutes, Pre-Draft Summary, 24 Oct 01	Montgomery Watson Harza	2142 CD 11
Oct 01	Long-Term Groundwater Sampling Program, Irrigation, Municipal and Production Well Monitoring Report, Third Quarter 01	Jacobs Engineering Group, Inc.	2143 CD 11
31 Oct 01	CDTSC Letter to Base Concerning Final ROD, Part 1, SCOU	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2144 CD 11
13 Nov 01	MWH Letter to Base Concerning Air Quality Requirements, DA-5	Arroyo, Shari L Montgomery Watson Harza	2145 CD 11

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13 Nov 01	MWH Letter to Base Concerning Criteria for a Permit to Operate SVE System, DA-5	Arroyo, Shari L Montgomery Watson Harza	2146 CD 11
13 Nov 01	MWH Letter to Base Concerning Criteria for a Permit to Operate SVE System, Bldg 1350	Arroyo, Shari L Montgomery Watson Harza	2147 CD 11
13 Nov 01	MWH Letter to Base Concerning Air Quality Requirements, Bldg 1350	Arroyo, Shari L Montgomery Watson Harza	2148 CD 11
Dec 01	Fact Sheet, Enviro Fact Sheet, Public Comment Period	AFBCA/DD Castle	2153 CD 11
11 Dec 01	CDTSC Letter to Agencies Concerning Request for Time Extension on Draft Comprehensive Basewide RI/FS, Part Two	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2149 CD 11
27 Dec 01	CRWQCB Letter to Base Concerning Comprehensive Basewide RI/FS, Part Two	Austin, Duncan California Regional Water Quality Control Board	2150 CD 11
28 Dec 01	RPM Meeting Minutes, 26 Nov 01	Montgomery Watson Harza	2151 CD 11
31 Dec 01	EPA Letter to Base Concerning FFS, Final Remedy for Non-VOC Contamination, FTA-1	Seid, Raymond EPA Region IX	2152 CD 11
04 Jan 02	MWH Letter to Base Concerning Criteria For Permit to Operate SVE System, Bldg 1762	Arroyo, Shari L Montgomery Watson Harza	2154 CD 11
07 Jan 02	RAB Meeting Minutes, 27 Nov 01	Montgomery Watson Harza	2160 CD 11

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Feb 02	Long-Term Groundwater Sampling Program, Annual Report 01	Jacobs Engineering Group, Inc.	2155 CD 11
04 Feb 02	Base Letter to Residents Concerning Water Sampling Results	LaFreniere, Steve AFBCA/DD Castle	2156 CD 11
04 Feb 02	TWG Meeting Minutes, 30 Jan 02	Jacobs Engineering Group, Inc.	2157 CD 11
07 Feb 02	CRWQCB Letter to Base Concerning Draft Final FFS, Final Remedy for Non-VOC Contamination, Vol I, FTA-01	Austin, Duncan California Regional Water Quality Control Board	2161 CD 11
08 Feb 02	RPM Meeting Minutes, 16 Jan 02	Montgomery Watson Harza	2162 CD 11
15 Feb 02	CDTSC Letter to Base Concerning Draft Final FFS, Final Remedy For Non-VOC Contamination, FTA-1	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2163 CD 11
19 Feb 02	CRWQCB Letter to TWG Members Concerning TWG Meeting, 30 Jan 02	Austin, Duncan California Regional Water Quality Control Board	2158 CD 11
21 Feb 02	Base Letter to Regulators Concerning Request for Schedule Extension for ROD, Part Two, SCOU	LaFreniere, Steve AFBCA/DD Castle	2159 CD 11
25 Feb 02	Project Note 3, Data Results of Soil Vapor Sampling, JP-7	Montgomery Watson Harza	2164 CD 11
27 Feb 02	RPM Meeting Minutes, 27 Feb 02	Montgomery Watson Harza	2185 CD 11

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Mar 02	Final Year End Monitoring Report, PFFA	Parsons Engineering Science, Inc.	2165 CD 11
12 Mar 02	Base Response to EPA and CDTSC Comments on Draft Comprehensive Basewide RI/FS Part Two	AFBCA/DD Castle	2166 CD 11
21 Mar 02	RAB Meeting Minutes, 26 Feb 02	AFBCA/DD Castle	2167 CD 11
Apr 02	FFS, FTA-1	Jacobs Engineering Group, Inc.	2168 CD 11
Apr 02	Final Work Plan Addendum, PFFA	Parsons Engineering Science, Inc.	2169 CD 11
Apr 02	Evaluation of Wetlands Technical Report	Earth Tech, Inc	2170 CD 11
02 Apr 02	Base Letter to Regulators Concerning Transmittal of Proposed Actions Report, City of Atwater Municipal Water Supply Well AM18	LaFreniere, Steve AFBCA/DD Castle	2171 CD 11
02 Apr 02	Base Letter to Regulators Concerning Transmittal of Recommendation for Shutdown of EW15, EW17 and EW24 Report	LaFreniere, Steve AFBCA/DD Castle	2172 CD 11
02 Apr 02	Base Letter to Regulators Concerning Transmittal of Work Plan for Wellhead Treatment at MW824 and MW883/MW933	LaFreniere, Steve AFBCA/DD Castle	2173 CD 11
02 Apr 02	Proposed Actions Report, City of Atwater Municipal Water Supply Well AM18	Jacobs Engineering Group, Inc.	2188 CD 11

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02 Apr 02	Recommendation for Shutdown of EW15, EW17 and EW24 Report	Jacobs Engineering Group, Inc.	2189 CD 11
02 Apr 02	Work Plan for Wellhead Treatment at MW824 and MW883/MW933	Jacobs Engineering Group, Inc.	2190 CD 11
09 Apr 02	Base Letter to Regulators Concerning Transmittal of Removal of Inorganic Constituents From Groundwater, Cost Analysis and Request for Waiver Report	LaFreniere, Steve AFBCA/DD Castle	2174 CD 11
09 Apr 02	RI/FS, Comprehensive Basewide Part Two Meeting Minutes, 09 Apr 02	Jacobs Engineering Group, Inc.	2175 CD 11
09 Apr 02	RPM Meeting Minutes, 09-10 Apr 02	Montgomery Watson Harza	2177 CD 11
09 Apr 02	Removal of Calcium, Chloride, TDS and Other Inorganic Constituents From Groundwater Report	Jacobs Engineering Group, Inc.	2191 CD 11
26 Apr 02	CRWQCB Letter to Base Concerning Work Plan for Environmental Remediation and Construction, PFFA	Austin, Duncan California Regional Water Quality Control Board	2176 CD 11
May 02	ROD, Final Part One, SCOU	WPI, Inc	2178 CD 11
06 May 02	Base Comments on Draft Site Closure Request Letter, DA-6	AFBCA/DD Castle	2179 CD 11
20 May 02	CDTSC Letter to Base Concerning Long-Term Groundwater Sampling Program, Annual Report 01	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2180 CD 11

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DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE/CD NUMBER
22 May 02	Base Letter to Regulators Concerning CCR Title 27 and CFR Title 40, Notification of Exceeding Groundwater Criteria	LaFreniere, Steve AFBCA/DD Castle	2181 CD 11
28 May 02	CDTSC Letter to Base Concerning Evaluation of Wetlands, Final Technical Report	Tatoian Cain, Carolyn V California Department of Toxic Substances Control	2182 CD 11
30 May 02	EPA Letter to Base Concerning Proposed Actions, City of Atwater Municipal Water Supply Well AM18	Seid, Raymond EPA Region IX	2183 CD 11
30 May 02	EPA Letter to Base Concerning Long-Term Groundwater Sampling Program, Annual Report 01	Seid, Raymond EPA Region IX	2184 CD 11
Jun 02	Final Work Plan for Environmental Remediation and Construction, PFFA	Parsons Engineering Science, Inc.	2106 CD 11
12 Jun 02	CRWQCB Letter to Base Concerning Draft Landfill 4 and Landfill 5 Closure Report	Austin, Duncan California Regional Water Quality Control Board	2101 CD 11
12 Jun 02	CRWQCB Letter to Base Concerning Draft O & M Manual, Underground Fuel Leak 2, SVE System	Austin, Duncan California Regional Water Quality Control Board	2114 CD 11
27 Sep 02	Administrative Record File Index	LABAT-ANDERSON INCORPORATED	01 CD 1
Multiple Dates	7 Audio Tapes, 1 VHS Tape Concerning TRC Meetings	93 BW/PA	894 CD 5

APPENDIX C

HHRA UPDATE

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Transmittal # 012

CASTLE AIRPORT TRANSMITTAL

To: Mr. Juan Perez
HQ AFCEE/ERB
3207 North Road (Bldg. 532)
Brooks AFB, TX 78235-5363

Date: 3 July 2001
Contract No.: F41624-00-D-8031
T.O. No.: 0010
Project No.: 05Z01001
Project Name: Comprehensive Basewide Part II Remedial Investigation/Feasibility Study, Proposed Plan, and Record of Decision

From: Campbell McLeod
Project Manager

for Amir Matin
Program Manager

ENCL. NO.	TYPE OF DELIVERABLE	VERSION	DESCRIPTION OF DELIVERABLE	DATE	NUMBER OF PAGES
1.	Project Note	Revision 4	Project Note #003: Evaluation of Changes Affecting the SCOU Baseline Human Health Risk Assessments, Selected Remedies and Remedial Action Objectives	7/3/01	

REMARKS: This project note has been updated to address written comments received from the EPA and is resubmitted as Revision 4. This project note will also be included in the appendices of SCOU ROD 1 and SCOU ROD 2.

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CB RI/FS–Part 2 Study
Proposed Plan and ROD

Project Note #003

Revision 4

Evaluation of Changes Affecting the SCOU Baseline Human Health Risk Assessments, Selected Remedies and Remedial Action Objectives

July 2001

Prepared for
Department of the Air Force
Castle Airport, California

Prepared by
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USAF Contract No. F41624-00-D-8031, Task Order No. 10
Jacobs Project No. 05Z01001

Air Force Center for Environmental Excellence
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1 INTRODUCTION

A review of Source Control Operable Unit (SCOU) sites has been conducted to determine whether changes in toxicity factors and exposure parameters that have occurred since completion of the SCOU baseline human health risk assessment (BHHRA) have had an effect on human health risks and associated remedial response decisions. This review was intended to determine whether any adjustments are required to selected remedies or remedial action objectives for SCOU sites, particularly for SCOU Record of Decision (ROD) 1, but also for the SCOU ROD 2.

The following questions are addressed by this review:

1. Do no further action (NFA) sites remain as NFA when the new risk factors are considered? (SCOU ROD 1 issue)
2. Do non-petroleum related risk issues surface when the new risk factors are considered for the petroleum hydrocarbon only (PHO) sites? (SCOU ROD 1 issue)
3. Are new contaminants of concern (COCs) introduced at SCOU sites when the new risk factors are considered? (SCOU RODs 1 and 2 issue)
4. Are any of the remedial action objectives (RAOs) affected by changes in toxicity factors and other risk assessment parameters? What are the implications of the revised RAOs on completed removal actions?

For the purposes of this discussion, COCs are defined as contaminants of potential concern (COPCs) that exceed the health protective thresholds of 1.0E-06 for cancer risk, 1.0 for non-cancer hazard and 10 μg/dL for estimated blood-lead concentration. COPCs are chemicals that were evaluated in the SCOU BHHRA.

2 RESULTS AND CONCLUSIONS

A summary of the responses to each question follows:

1. Do NFA sites remain as NFA when the new risk factors are considered? (SCOU ROD 1 issue)
   - All of the SCOU ROD 1 NFA sites remain as NFA sites, with some modification to the definition of the Storm Drain System (SDS) site.
2. Do non-petroleum related risk issues surface when the new risk factors are considered for the PHO sites? (SCOU ROD 1 issue)
   - Cadmium at levels approximately two times the revised Castle RAO was detected at two surface sample locations at Discharge Area 2 (DA-2). Lead, at concentrations that exceed the residential RAO of 400 mg/kg, was also detected in the same two surface samples at DA-2. The surface excavation conducted at DA-2 to address total extractable and total volatile petroleum hydrocarbon (TEPH/TVPH) contamination did not address the area of these sample locations. No other non-petroleum related COCs were identified at PHO sites as a result of using the revised toxicity values.
3. Are new COCs introduced at SCOU sites when the new risk factors are considered? (SCOU RODs 1 and 2 issue)
   - Cadmium and lead are new COCs at DA-2.
   - Cadmium, lead, benzo(a)pyrene and 1,2-dichloroethane are new COCs for the residential scenario (necessary to avoid institutional controls) at LF-1.
   - Benzo(a)anthracene and benzo(b)fluoranthene are new COCs at B1344. Cadmium is also a new COC for the residential scenario (necessary to avoid institutional controls).
   - Benzo(a)anthracene and benzo(b)fluoranthene are new COCs at LF-3.
4. Are any of the RAOs affected by changes in toxicity factors and other risk assessment parameters? What are the implications of the revised RAOs on completed removal actions?
   - Revised Castle RAOs were calculated based on the revised risk factors and parameters (Tables 12, 13 and 14). Changes in RAO values are presented on the tables. The revised RAOs will be incorporated into the SCOU ROD 1. Except for DA-2 and ETC-10, the removal actions attained all of the revised RAOs. Isolated detections of lead and cadmium at DA-2, and lead at ETC-10, are present at a concentration greater than the respective RAOs.

3 RISK ASSESSMENT CHANGES

Risk assessment changes affecting the calculation of cancer risk, non-cancer hazard and lead exposure were evaluated to determine the impact on selected remedy decisions and on RAOs. The exposure input parameters used in both the 1996 SCOU BHHRA and the current update are shown in Tables 1 and 2.

3.1 CANCER RISK

1. All COPCs used in the SCOU BHHRA were reviewed to determine whether new slope factors had been established since publication of the SCOU RI/FS in 1996. Table 3 summarizes the slope factors used for the SCOU in comparison to the current slope factors. The columns for maximum oral and inhalation slope factor indicate the most current factors applicable for this review. The last two columns, which provide the ratio of the current factors to the factors used in the SCOU, indicate the magnitude of the revision to the slope factor and whether the revision results in increased risk (>1) or decreased risk (<1). Table 4 summarizes those COPCs with revised slope factors that could affect the SCOU BHHRA. The revised factors represent the more conservative (higher) of the current EPA and California oral and inhalation slope factors.
2. Those COPCs having revised slope factors that are less than those used in the SCOU BHHRA will result in decreased cancer risk at SCOU sites. As shown by the ratio of the revised factor to the SCOU factor shown in Table 4, these COPCs include chlordane; chrysene; dibenz(a,h)anthracene; 1,4-dichlorobenzene; polychlorinated biphenyls (PCBs); and 1,1,2,2-tetrachloroethane.
3. COPCs with new or revised slope factors greater than those used in the SCOU BHHRA will result in increased cancer risk at affected SCOU sites: cadmium; nickel; carbon tetrachloride; chloroform; pentachlorodibenzofurans; 1,2-dibromo-3-chloropropane; dibromochloromethane; 1,2,4-trichlorobenzene; and 1,1,2-trichloroethane. At least one of the slope factors for these COPCs—cadmium; nickel; pentachlorodibenzofurans; and 1,2,4-trichlorobenzene—are newly established since publication of the SCOU RI/FS. Therefore, the associated pathways were not evaluated quantitatively in the SCOU BHHRA.

3.2 NON-CANCER HAZARD

1. All COPCs used in the SCOU BHHRA were reviewed to determine whether new reference doses have been established since publication of the SCOU RI/FS in 1996. Table 5 summarizes the reference doses used for the SCOU in comparison to the current reference doses. The last two columns, which provide the ratio of the SCOU reference doses to the current reference doses, indicate the relative impact of the revised reference dose and whether the revision results in increased hazard (>1) or decreased hazard (<1). Table 6 summarizes those COPCs with revised reference doses that could

affect the SCOU BHHRA. The revised doses represent the more conservative (lower) of either the current EPA IRIS or HEAST oral and inhalation reference doses.

2. COPCs having revised reference doses that are greater than those used in the SCOU BHHRA will result in decreased non-cancer hazard at SCOU sites. As shown by the ratio of the SCOU factor to the revised factor shown in Table 6, these COPCs are chromium; benzene; carbon tetrachloride; chlordane; chlorobenzene; isopropylbenzene; hexachlorobutadiene; tetrachloroethylene; and 1,2,4-trichlorobenzene.

3. COPCs having new or revised reference doses less than those used in the SCOU BHHRA will result in increased non-cancer hazard at affected SCOU sites. These COPCs include: aluminum; beryllium; cadmium; cobalt; manganese; thallium; bromochloromethane; n-butylbenzene; sec-butylbenzene; t-butylbenzene; chloroform; chrysene; isopropyltoluene; DDD; DDE; dibenz(a,h)anthracene; dibenzofuran; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; dichlorofluoromethane; 1,2-dichloroethane; indeno(1,2,3-c,d)pyrene; 2-methyl naphthalene; naphthalene; phenanthrene; 1,1,2,2-tetrachloroethane; 1,1,1-trichloroethane; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; vinyl chloride; and xylenes. Of these COPCs, at least one of the reference doses for all but cobalt; manganese; thallium; chloroform; 1,4-dichlorobenzene; 1,2-dichlorobenzene; naphthalene; vinyl chloride; and xylenes are newly established since publication of the SCOU RI/FS. Therefore, the associated pathways were not evaluated quantitatively in the SCOU BHHRA.

3.3 LEAD

Lead at SCOU sites was evaluated in the BHHRA by estimating blood-lead levels for the child receptor using the Cal-EPA blood-lead biokinetic uptake model (Department of Toxic Substances Control [DTSC], 1992). With the exception of using a site-specific value for lead in water (0.3 µg/L), default values for the current model (Version 7) were used to update estimated blood lead levels (with and without the produce pathway) presented in the SCOU BHHRA. The results of the current model compared to the SCOU BHHRA results for the child residential scenario are provided in Table 7.

As seen in Table 7, calculations for two additional sites (LF-1 Area 1 Subsurface and DA-2 Surface) indicate their lead levels now exceed the nominal estimated blood-lead decision criteria of 10 micrograms per deciliter (µg/dL). Lead is a new COC at these sites. Section 6 addresses whether lead has been addressed by the LF-1 removal action or petroleum related cleanup actions at DA-2.

Using the current model to back calculate from a target blood-lead level of 10 μg/dL, the risk-based remedial action objective was determined to be 387 mg/kg for the child residential receptor, without the produce pathway. This value compares favorably with the 1996 Castle RAO and the 2000 EPA PRG, both of which are 400 mg/kg for the residential scenario, without the produce pathway.

4 UPDATED CANCER RISK AND NON-CANCER HAZARD

Table 8 presents a summary of the risk assessment results provided in the SCOU BHHRA compared to updated results using current toxicity values and reference doses. Although the child residential and occupational scenarios were also updated, results in Table 7 are for the adult residential scenario since this scenario was generally used for remedy selection at Castle Airport. Only those results affected by revisions to slope factors and reference doses are shown. For all calculations, a particulate emission factor (PEF) of 8.99E+08 was used for the inhalation routes instead of the 4.63E+09 value used in the SCOU BHHRA (see Tables 1 and 2 for exposure input parameters). Results presented in bold represent sites for which the cancer risk or non-cancer hazard has increased from below to above the decision criteria of 1.0E-06 and 1.0, respectively.

Exposure pathways included in the adult residential scenario at Castle Airport are incidental soil ingestion, inhalation of particulates, inhalation of volatiles, ingestion of homegrown fruits and vegetables (produce pathway) and dermal contact with soil contaminants. As reported in the SCOU BHHRA, there is a high degree of uncertainty associated with the produce pathway. Many of the past, current and planned land uses at Castle Airport have been identified as aviation support or industrial. Hence, the use of the residential scenario, with the produce pathway, is likely to overestimate risk associated with actual human exposures. The SCOU BHHRA also assumes complete exposure pathways for human receptors, when, in fact, many site areas are paved with asphalt or concrete. In addition, the model used to estimate the uptake and incorporation of contaminants into plant tissues is simplified and incorporates conservative assumptions that are likely to overestimate the concentration of contaminants in plant tissues by several orders of magnitude. Therefore, risk managers must be aware that, due to the high degree of uncertainty, incorporation of the produce pathway is likely to overestimate risk.

4.1 RESULTS

As can be seen in Table 8, application of the current toxicity values resulted in five sites—B1562, DA-2, DA-3, LF-1 and SDS—that newly exceed the nominal decision point of

1.0E-06 cancer risk. In addition, subsurface soil at B1344 now exceeds 1.0E-06 cancer risk-based on updated SCOU data gap results. Revisions to reference doses resulted in four sites—B1260, DA-5, FTA-1 and SDS Area 2—that exceed the nominal non-cancer hazard decision point of 1.0. Revisions to estimated blood-lead concentrations resulted in five sites —DA-2, DA-3, LF-1 Area 1, LF-2 Area 2, and Stain 41—that exceed the nominal blood-lead concentration decision point of 10 μg/dL. Each of these sites is discussed in this section.

B1562—Risk is increased from 5.6E-08 to 1.8E-06 due to the addition of the oral exposure pathway for cadmium. The percentage contribution of cadmium to total risk increased from 3 to 97 percent due to this change. Cadmium is the only contaminant that exceeds 1.0E-06 cancer risk. B1562 is an NFA site in the SCOU ROD 1.

ACTION: Because of the relatively low risk calculated for B1562 in the SCOU BHHRA screening process, a more rigorous quantitative risk assessment was not performed in the BHHRA. However, due to the updated results, a revised screening risk assessment, including the home grown produce pathway, was performed for B1562 (Table 9). The updated BHHRA cancer risk is 5.3E-05 with 100 percent of the risk due to cadmium. However, 99 percent of the cancer risk from cadmium is from the produce pathway, which is not utilized in the calculation of Castle RAOs. Without consideration of the produce pathway, cancer risk at B1562 is 7.1E-07. Therefore, the NFA designation for B1562 remains appropriate.

DA-2—Risk is increased from 1.8E-08 to 5.5E-06 due to the addition of the oral exposure pathway for cadmium. The percentage contribution of cadmium to total risk increased from 25 to 100 percent due to this change. Cadmium is the only contaminant that exceeds 1.0E-06 cancer risk. The estimated blood-lead concentration for the child scenario increased from 9.2 to 15.4 μg/dL due to lead in the surface soil without the plant pathway. DA-2 is a PHO site in the SCOU ROD 1.

ACTION: Because of the relatively low risk calculated for DA-2 in the SCOU BHHRA screening process a more rigorous quantitative risk assessment was not performed in the

BHHRA. However, due to the updated results, a revised screening risk assessment, including the home grown produce pathway, was performed for DA-2 (Table 10). The updated cancer risk for DA-2 is 1.6E-04, with 100 percent of the risk due to cadmium. However, 99 percent of the risk from cadmium is due to the produce pathway, which is not utilized in the calculation of Castle RAOs. Without consideration of the produce pathway, the cancer risk is 2.1E-06. Similarly, the updated non-cancer hazard is 2.1, with 98 percent of the hazard due to cadmium. Ninety-eight percent of the hazard due to cadmium is due to the produce pathway. Non-cancer hazard at DA-2, without the produce pathway is 0.05. When the produce pathway is removed from the calculation, the cancer risk at DA-2 is slightly above the decision criterion of 1.0E-06. The updated estimated blood-lead concentration of 15.4 μg/dL, without the produce pathway, is above the protective level of 10 μg/dL. An evaluation of DA-2 cadmium and lead levels relative to revised Castle RAOs is presented in Section 6.

DA-3—Risk at DA-3 was considered to be insignificant in the SCOU BHHRA, primarily because the methylene chloride detected at the site was suspected to be a lab contaminant. The SCOU update resulted in 5.1E-05 cancer risk and an index of 0.7 for non-cancer hazard. The increase in risk and hazard is due to the addition of the oral exposure pathway for cadmium. Cadmium contributes 100 percent of the cancer risk and 88 percent of the non-cancer hazard. Cadmium is the only contaminant that exceeds 1.0E-06 cancer risk. The estimated blood-lead concentration for the child scenario due to lead in the surface soil with the plant pathway increased from 18.9 to 35.2 μg/dL. Without the plant pathway, the updated surface result is 20.6 μg/dL. As a result of a removal action that was implemented at the site, DA-3 is an NFA site in the SCOU ROD 1.

ACTION: Ninety-nine percent of the cancer risk at DA-3 is contributed by the homegrown produce pathway, which is not utilized in the calculation of Castle RAOs. Without consideration of the produce pathway, the cancer risk is 6.7E-07, which is below the health protective threshold of 1.0E-06. An evaluation of DA-3 lead levels relative to the updated Castle RAOs is provided in Section 6.

LF-1 Areas 1 and 2—According to the SCOU ROD 1, the occupational scenario is appropriate for LF-1. Revised cancer risk values for the occupational scenario at LF-1 did not exceed 1.0E-06; therefore, the updated risk assessment results do not result in any additional COCs at LF-1. LF-1 is an NFA site in the SCOU ROD 1 that has undergone a removal action. For completeness and consistency, the following discussion addresses updates to the residential scenario:

Risk is increased from 3.1E-07 to 2.5E-05 in LF-1 Area 1 subsurface soil, from 8.8E-07 to 1.8 E-05 in LF-1 Area 2 surface soil, and from 9.0E-08 to 8.1 E-06 in LF-1 Area 2 subsurface soil. The cancer risks for LF-1 Area 1 surface soil and LF-1 Area 3 surface soil were reported in excess of 1.0E-06 in the SCOU BHHRA, and are further increased by the updated results. In all cases, cadmium is the only COPC with revised slope factors that result in increased risk. In the SCOU BHHRA, cadmium did not contribute significant (>1 percent) risk for any of the scenarios, whereas in the updated results, cadmium contributes from 83-99 percent of the cancer risk. Cadmium is the only COC contributing cancer risk equal to or greater than 1.0E-06 at LF-1, except for benzo(a)pyrene and 1,2-dichloroethane at LF-1 Area 1 surface soil. At LF1 Area 1, the estimated blood-lead concentration for the child scenario increased from 5.5 and 5.1 µg/dL in the SCOU BHHRA to 19.3 and 11.7 µg/dL in the updated subsurface results, with and without the plant pathway, respectively.

ACTION: No revision to the selected remedy is required, since the updated cancer risk and non-cancer hazard did not exceed the respective decision points of 1.0E-06 and 1.0 for the occupational scenario. However, in order to avoid institutional controls, attainment of applicable residential RAOs will be confirmed for all COCs at LF-1 (see Section 6).

SDS Areas 1—The cancer risk for SDS Area 1 was reported in excess of 1.0E-06 in the SCOU BHHRA (3.8E-05) and increased to 1.2E-03 in the updated results. The only COPC with revised slope factors that could increase risk is cadmium. In the SCOU BHHRA, cadmium had contributed <1 percent risk to Area 1, while in the updated results, cadmium contributes 97 percent. Cadmium, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene each contribute risk in excess of 1.0E-06.

The hazard for SDS Area 1 was reported in excess of 1.0 in the SCOU BHHRA (7.3) and increased to 14.4 in the updated results due to revised reference doses for cadmium, cobalt, chrysene and phenanthrene. Cadmium is the largest contributor to hazard in the SCOU BHHRA (Area 1—96%) and in the updated results (Area 1—98 percent). SDS (Area 1 and 2) is a NFA site in the SCOU ROD 1.

ACTION: The Area 1 sampling location (SDSE09) is in a pipe section that leads from B1350 to the SDS. The pipe section is accessed via a grated interceptor box on the northeast side of B1350. Sediment from the B1350 lateral presumably collected in the box. Due to discontinued operations and the passing of time, it is not certain that the contaminated sediment remains in the box or whether the location can be considered representative of the entire Area 1. The highest cadmium result within Area 1 was 65.6 mg/kg, detected at SDSE09. The next highest was 2.3 mg/kg at SDSE12, which was taken in an open stretch of the SDS. The SDSE12 value is above background but considerably lower than the SDSE09 value.

Since SDSE09 drives the risk at SDS1 and the sample location is outside of the SDS, a revised risk assessment was performed for SDS 1 without this sample result (Table 11). The revised cancer risk and non-cancer hazard are 7.9E-05 and 0.8, respectively for SDS-1. Based on these revised results, SDS-1 does not exceed the decision criteria for non-cancer hazard but still exceeds the decision criteria for cancer risk.

For both the original and updated BHHRA cancer risk values, a high proportion of the risk (91 percent) is associated with the produce pathway. Without consideration of the produce pathway, which is not used in the Castle RAO calculation and should be considered an unlikely pathway for the SDS, the updated cancer risk result for SDS 1 is 7.2E-06. The updated non-cancer hazard, without consideration of the produce pathway, is 0.1. Given these results, SDS Area 1 can remain as NFA in the SCOU ROD 1. Despite the cancer risk at SDS Area 1 being slightly greater than the decision criterion of 1.0E-06, NFA is appropriate because the assumptions for an adult residential scenario for the SDS would be very conservative (i.e., exposure duration at the SDS would not be as high as under the residential scenario). However, the sediments associated with SDSE09 will be removed from the box under routine operation and maintenance activities.

SDS Area 2— Cancer risk is increased from 1.4E-07 to 6.8E-05 for SDS Area 2. The only COPC with revised slope factors that could increase risk is cadmium. In the SCOU BHHRA, cadmium had contributed 1 percent of the cancer risk to Area 2, while in the updated results cadmium contributes 100 percent. Cadmium is the only COC contributing risk in excess of 1.0E-06.

The non-cancer hazard at SDS Area 2 increased from 0.6 to 1.0 as a result of revised reference doses for cadmium and cobalt. Cadmium is the largest contributor to hazard in the SCOU BHHRA (Area 2—74 percent) and in the updated results (Area 2-84 percent).

ACTION: For both the original and updated BHHRA cancer risk values, a high proportion of the risk (99 percent) is associated with the produce pathway. Without consideration of the produce pathway, which is not used in the Castle RAO calculation and should be considered an unlikely pathway for the SDS, the updated cancer risk result for SDS 2 is 8.9E-07. The non-cancer hazard, without consideration of the produce pathway, is 0.01. Given these results, SDS Area 2 can remain as NFA in the SCOU ROD 1.

B1260— Non-cancer hazard at B1260 increased from 0.2 to 1.0 in subsurface soil due to revised reference doses for n-butylbenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; isopropyltoluene; naphthalene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and xylenes. Hazard at B1260 is driven by the dichlorobenzenes (85 percent combined total), methylene chloride (10 percent), and naphthalene (5 percent). None of the COPCs exceed a 1.0 non-cancer hazard on its own. B1260 is a SCOU ROD 2 site that is part of the B54 Group slated for SVE and bioventing.

ACTION: No revision to the selected remedy is required, since the revised hazard is very low and there are no individual contaminants contributing hazard greater than 1.0.

DA-5—Non-cancer hazard at DA-5 increased from 0.3 to 1.3 in surface soil due to revised reference doses for cadmium; cobalt; sec-butylbenzene; isopropyltoluene; 2-methylnaphthalene; naphthalene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and xylenes. Hazard at DA-5 is driven by 2-methylnaphthalene (51 percent), naphthalene (25 percent) and cadmium (19 percent). None of the COPCs exceeds a 1.0 non-cancer hazard on its own. DA-5 is a SCOU ROD 2 site for which the selected remedy is SVE with bioventing, plus excavation and on-site disposal of metal-contaminated soil.

ACTION: No revision to the selected remedy is required since the revised hazard is very low and there are no individual contaminants contributing hazard greater than 1.0. Implementation of the selected remedy in accordance with revised RAOs will address reduction of non-cancer hazard to protective levels.

FTA-1—Non-cancer hazard at FTA-1 increased from 0.9 to 1.1 in surface soil due to revised reference doses for beryllium; cadmium; cobalt; sec-butylbenzene; t-butylbenzene; chrysene; 1,2 dichloroethane; indeno(1,2,3)pyrene; isopropyltoluene; 2-methylnaphthalene; naphthalene; phenanthrene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and xylenes. Hazard at FTA-1 due to surface soil contamination is driven by nickel (37 percent), cadmium (20 percent), arsenic (18 percent), 4-methylphenol (11 percent) and 1,2-dibromo-3-chloropropane. None of the COPCs exceeds a 1.0 non-cancer hazard on its own. FTA-1 is a SCOU ROD 2 site for which the selected remedy is SVE with bioventing plus capping and institutional controls.

ACTION: FTA-1 is the subject of a Focused Feasibility Study (FFS) to determine whether additional measures to those implemented by the FTA-1 removal action are required to ensure protection of human health and the environment. The FFS will be conducted with consideration of the revised risk assessment results and RAOs. A revision to the selected remedy to specifically address the revised non-cancer hazard posed by surface soils is not anticipated since the revised hazard is very low and there are no individual contaminants contributing hazard greater than 1.0. In addition, implementation of the selected remedy in accordance with revised RAOs will (or has, given the existing cap at the site) decrease or eliminate the exposure pathways for non-cancer hazard at FTA-1.

LF2 Area 2—An estimated blood-lead concentration for the child scenario increased from 8.1 to 10.4 µg/dL due to lead in surface soil with the plant pathway. Without the plant pathway, the result is 6.7 µg/dL. LF-2 is an NFA site in SCOU ROD 1 that has undergone a removal action.

ACTION: The estimated blood-lead concentration without the produce pathway is less than the health protective level of 10 µg/dL. Therefore, no revision to the selected remedy is required.

STA-41— The estimated blood-lead concentration for the child scenario increased from 9.0 to 12.5 µg/dL due to lead in surface soil with the plant pathway. Without the plant pathway, the result is 7.9 µg/dL. STA-41 is an institutional control site in the SCOU ROD 2.

ACTION: The estimated blood-lead concentration without the produce pathway is less than the health protective level of 10 µg/dL. Therefore, no revision to the selected remedy is required.

5 REVISED REMEDIAL ACTION OBJECTIVES

Using the procedure established in Section 4.4.2.5 of the SCOU ROD Part 1, updated Castle RAOs were calculated and are presented in Tables 12, 13 and 14 for VOCs, SVOCs, and metals, respectively. When the RAO has changed, the former RAO is shown in parentheses on the respective tables next to the updated RAO. RAOs for the adult residential and occupational scenarios are provided. Differences in RAOs between 1996 and 2001 are due to the revisions to exposure input parameters identified in Tables 1 and 2, and the revisions to toxicity factors identified in Tables 3 through 6. Generally, the effect of revisions to toxicity factors is more significant than the relatively minor revisions to the exposure input parameters.

6 AFFECTED SELECTED REMEDIES AND REMOVAL ACTIONS

As necessary, the sites which newly exceed the risk decision criteria of 1.0E-06, 1.0, and 10 µg/dL, respectively, for cancer risk, non-cancer hazard and estimated blood-lead concentration, were evaluated relative to the revised Castle RAOs to determine whether the selected remedies can be confirmed or require modification. Based on the evaluation presented in Section 4, the affected sites include DA-2, DA-3 and LF-1. In addition, all completed removal actions were evaluated for attainment of the updated RAOs. More detailed discussions follow.

DA-2—The updated BHHRA for DA-2 specifies cadmium and lead as COCs. The revised Castle risk-based RAO for cadmium is 4.4 mg/kg, which is lower than the WQSA value and would, therefore, be the Castle RAO. The maximum cadmium concentration at DA-2 was 9.1 mg/kg, which exceeds the revised Castle RAO (Note: the EPA PRG is 9.0 mg/kg). Two surface samples at DA-2 (9.1 mg/kg at DA2SB08 and 7.6 mg/kg at DA2SB11) exceeded the TBV and the revised Castle RAO for cadmium. These two sample locations also had lead concentrations that exceed the TBV and the revised Castle residential RAO (639 mg/kg at DA2SB08 and 481 mg/kg at DA2SB11). The sample locations are immediately adjacent to each other, at the southwest corner of the washrack sump. This area was not included in the surface excavation conducted at DA-2 to address TEPH/TVPH contamination.

However, no further action (NFA) is recommended for DA-2 because: 1) reuse for the DA-2 site area is designated as Aviation Support; 2) the detected levels of cadmium and lead are below the Castle occupational RAOs and the WQSA levels for protection of groundwater; and 3) the affected area is known to be small.

DA-3—Both the original SCOU BHHRA and the update identify lead as a COC at DA-3. A removal action was implemented at DA-3 between June and August 2000 to address lead-contaminated soil. Contamination results indicated that the highest remaining lead concentration was 42.6 mg/kg (*Closure Report for CERCLA and Petroleum Hydrocarbon-*

Contaminated Excavation/Disposal Sites, Jacobs, 2000),which is well below the updated Castle RAO of 400 mg/kg.

LF-1—Cadmium; lead; benzo(a)pyrene; and 1,2-dichloroethane are the only COCs at LF-1. The revised Castle risk-based RAOs are 4.4 mg/kg for cadmium, 400 mg/kg for lead, 0.089 mg/kg for benzo(a)pyrene, and 0.043 mg/kg for 1,2-dichloroethane. Each of these values is less than the corresponding WQSA values and, therefore, would be the Castle RAOs. An evaluation of the confirmation sample results for LF-1 (Appendix F, Landfill 1 Closure Report) indicates that neither benzo(a)pyrene nor 1,2-dichloroethane were detected. The maximum detected results for cadmium and lead were 0.393 and 31.1 mg/kg, respectively, in the trench samples and 0.971 and 36.2 mg/kg, respectively, in the scrape samples (Table 3-1, LF-1 Closure Report). Therefore, all of the confirmation results for LF-1 were below the revised Castle RAOs.

In addition, completed removal actions were reviewed to determine if any new COCs or reduced RAOs were identified for the sites by the BHHRA update. Risk assessments for SCOU removal action sites that were affected by the BHHRA update include B871, B1344, DA-8, CVLFA, CVLFB, ETC-10, LF-1, LF-2, LF-3, LF-4, LF-5, and PCB-9. Risk assessments for ETC-2, Firing Range, Detonation and Burn Facility and DA-3 were not affected by the updates. Comparison of the COCs identified in the SCOU and the updated risk assessments was conducted to determine if any new COCs were appropriate.

- The updated risk assessments for CVLFA and DA-8 did not increase risk or hazard above 1.0E-6 and 1.0, respectively, so no new COCs were introduced by the updated risk assessment for these sites.
- Comparison of the SCOU and updated risk assessments for B871, CVLFB, ETC-10, LF-2, LF-4, LF-5 and PCB-9 indicated that there were no new COCs for these sites.
  - Based on a review of the respective closure documents, residual concentrations of COCs at B871, CVLFB, LF-2 , LF-4 and PCB-9 are all under the updated Castle risk-based RAOs.
  - At LF-5, one COC was deleted by the updated risk assessment and the RAO was increased for the other affected COC (1,4-dichlorobenzene).
  - ETC-10 is an area identified for industrial/occupational reuse. For the removal action implemented at ETC-10, the WQSA value of 855 mg/kg was used as the RAO, since the WQSA value was less than the risk-based occupational RAO. The

updated risk-based occupational RAO is 750 mg/kg. Therefore, the removal action at ETC-10 may not have achieved health protective levels for the occupational scenario.

- The updated risk assessment did not increase risk or hazard above 1.0E-06 or 1.0, respectively, for the occupational scenario, so no new COCs were introduced by the updated risk assessment for LF-1. However, as specified earlier in this section, attainment of the updated residential RAOs was confirmed so that institutional controls can be avoided. Additional COCs introduced when considering the residential scenario at LF-1 include cadmium, benzo(a)pyrene and 1,2-dichloroethane.

- New COCs for the occupational scenario at B1344 (benzo(a)anthracene and benzo(b)fluoranthene) and LF-3 (benzo(a)anthracene and benzo(b)fluoranthene) were identified by the updated risk assessment. In addition, cadmium is a new COC at B1344 under the residential scenario. Although the occupational scenario is appropriate at both B1344 and LF-3, the attainment of residential RAOs will avoid any potential institutional controls.

  - At B1344, a review of confirmation sampling results (Table 3-8, Closure Report for CERCLA and Petroleum Contaminated Excavation Sites) indicates the updated Castle residential RAOs were attained for PAHs. Cadmium (2 mg/kg) at B1344 was detected at less that the updated Castle residential RAO (4.4 mg/kg).

  - At LF-3, the residential RAOs for PAHs, including the new COCs, were attained during the removal action.

Table 1
Summary of Exposure Input Values Used for Risk Assessment, PRGs and RAOs

Input exposure parameter	Symbol	1996 EPA Region IX PRGs	2000 EPA Region IX PRGs[i]	Castle 1996 BHHRA/RAOs	Castle 2001 BHHRA/RAOs
Body weight, adult (kg)	BW_a	70	70	70	70
Body weight, child (kg)	BW_c	15	15	15	15
Averaging time - carcinogen (days)	AT	25550	25550	25550	25550
Averaging time, adult - noncarcinogens (days) [a]	AT_a	8760	8760	10950	10950
Averaging time, child - noncarcinogens (days) [a]	AT_c	2190	2190	2190	2190
Averaging time, worker - noncarcinogens (days) [a]	AT_w	9125	9125	9125	9125
Dermal Contact					
Skin surface area, adult (cm^2/day)	SA_a	5000 [b]	--	--	--
Skin surface area, adult resident (cm2/day)	SA_r	--	5700	5800	5700 [h]
Skin surface area, adult worker (cm2/day)	SA_w	--	3300	5000	5700 [h]
Skin surface area, child (cm2/day)	SA_c	2000 [b]	2800	2000	2900 [h]
Adherence factor (mg/cm^2)	AF	0.2	--	--	--
Adherence factor, adult resident (mg/cm2)	AF_r	--	0.07	0.2	0.07 [h]
Adherence factor, adult worker (mg/cm2)	AF_w	--	0.2	0.2	0.2 [h]
Adherence factor, child (mg/cm2)	AF_c	--	0.2	0.2	0.2 [h]
Skin absorption (unitless)					
- organics	ABS	0.1	--	cs	cs
- inorganics		0.01	--	cs	cs
- semi-volatile organics		--	cs	cs	cs
Exposure Frequency, adult [days/year]	EF_a	350	350	100	350 [h]
Exposure Frequency, child [days/year]	EF_c	350	350	350	350 [h]
Exposure Frequency, worker [days/year]	EF_w	250	250	250	250 [h]

Table 1
Summary of Exposure Input Values Used for Risk Assessment, PRGs and RAOs

Input exposure parameter	Symbol	1996 EPA Region IX PRGs	2000 EPA Region IX PRGs[i]	Castle 1996 BHHRA/RAOs	Castle 2001 BHHRA/RAOs
Inhalation					
Inhalation rate - adult (m^3/day)	IR_a	20	20	20	20
Inhalation rate - child (m^3/day)	IR_c	10	10	10	10
Soil Ingestion					
Soil ingestion - adult (mg/day)	IRS_a	100	100	100	100
Soil ingestion - child (mg/day)	IRS_c	200	200	200	200
Soil ingestion - adult worker (mg/day)	IRS_w	50	50	50	50
Exposure frequency - residential (days/yr)	EF_r	350	350	350	350
Exposure frequency - worker (days/yr)	EF_w	250	250	250	250
Exposure duration - residential (years)	ED_r	30 [c]	30 [c]	30 [d]	30 [d]
Exposure duration - child (years)	ED_c	6	6	6	6
Exposure duration - worker (years)	ED_w	25	25	25	25
Ingestion of Produce (resident)					
Ingestion Rate, adult [kg/day]	IRP_a	--	--	0.122	0.122
Ingestion Rate, child [kg/day]	IRP_c			0.122	0.122
Exposure Frequency, adult [days/year]	EF_a	--	--	350	350
Exposure Frequency, child [days/year]	EF_c			350	350
Exposure Duration, adult (ED) [yrs]	ED_a	--	--	30	30
Exposure Duration, child (ED) [yrs]	ED_c	--	--	6	6
Body Weight, adult (BW) [kg]	BW_a	--	--	70	70
Body Weight, child (BW) [kg]	BW_c	--	--	15	15
Averaging Time - cancer (AT) [days]	AT	--	--	25550	25550
Averaging Time, adult - noncancer (AT) [days]	AT_a	--	--	10950	10950
Averaging Time, child - noncancer (AT) [days]	AT_{ch}	--	--	2190	2190

Table 1
Summary of Exposure Input Values Used for Risk Assessment, PRGs and RAOs

Input exposure parameter	Symbol	1996 EPA Region IX PRGs	2000 EPA Region IX PRGs[i]	Castle 1996 BHHRA/RAOs	Castle 2001 BHHRA/RAOs
Age-adjusted factors for resident (carcinogens):					
Ingestion factor, soils ([mg-yr]/(kg/day])		114	114	126	126
Skin contact factor, soils ([mg-yr]/(kg/day])		503	503	657	657
Inhalation factor, ([mg^3-yr]/[kg/day])		11	11	12.6	12.6
Particulate emission factor	PEF	$1.316*10^9$ [e]	$1.316*10^9$ [e]	$4.63*10^9$ [f]	$8.99*10^8$ [g]
Volatilization factor for soil (m^3/kg)	VF	cs	cs	cs	cs
Soil saturation concentration (mg/kg)	sat	cs	cs	cs	cs

Notes

[a] *Averaging Time (AT) (days) = Exposure Duration (ED) (years) x 365 days/year*
[b] 25% of skin surface area
[c] Exposure duration for lifetime residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years).
[d] *Exposure duration for lifetime resident were assumed to be 30 years total. For carcinogens, exposures were based on 30 year adult.*
[e] U.S. Environmental Protection Agency (EPA). 1996. *Preliminary Remediation Goals.* Region IX.
[f] EPA, 1994.
[g] *Area-specific PEF calculated based on data from Fresno, California.*
[h] Department of Toxic Substances (DTSC). 2000. Memorandum from S. DiZio, M. J. Wade, and D. Oudiz to Human and Ecological Risk Division (HERD). Guidance for the Dermal Exposure Pathway (DRAFT). January 7.
i US Environmental Protection Agency (EPA). Nov., 2000 Preliminary Remediation Goals. Region IX.
j Chemical specific values for Absorption Fraction from Soil (ABS) used in dermal risk calculations are provided in Table 2.

cs = chemical-specific

Table 2
Absorption Fraction from Soil (ABS) Values Used in Dermal Risk Calculations

Chemical	ABS (JEG, 1997)	ABS (DTSC, 1994)	(USEPA, in preparation)	Proposed ABS
Aluminum	0.01	0.01	NA	0.01
Arsenic	0.03	0.03	0.03	0.03
Antimony	0.01	0.01	NA	0.01
Barium	0.01	0.01	NA	0.01
Beryllium	0.01	0.01	NA	0.01
Cadmium	0.001	0.001	0.001	0.001
Chromium	0.01	0.01	NA	0.01
Cobalt	0.01	0.01	NA	0.01
Copper	0.01	0.01	NA	0.01
Lead	0.01	0.01	NA	0.01
Manganese	0.01	0.01	NA	0.01
Mercury	0.01	0.01	NA	0.01
Molybdenum	0.01	0.01	NA	0.01
Nickel	0.01	0.01	NA	0.01
Selenium	0.01	0.01	NA	0.01
Silver	0.01	0.01	NA	0.01
Thallium	0.01	0.01	NA	0.01
Vanadium	0.01	0.01	NA	0.01
Zinc	0.01	0.01	NA	0.01
Acenaphthene	0.15	0.15	0.13	0.15
Acenaphthylene	0.15	0.15	0.13	0.15
Anthracene	0.15	0.15	0.13	0.15
Benzene	0.1	0.1	NA	0.1
Benzo(a)anthracene	0.15	0.15	0.13	0.15
Benzo(a)pyrene	0.15	0.15	0.13	0.15
Benzo(b)fluoranthene	0.15	0.15	0.13	0.15
Benzo(g,h,i)perylene	0.15	0.15	0.13	0.15
Benzo(k)fluoranthene	0.15	0.15	0.13	0.15
Bromochloromethane	0.1	0.1	NA	0.1
Di(2-ethylhexyl) phthalate	0.1	0.1	0.1	0.1
2-Butanone	0.1	0.1	NA	0.1
Butyl benzyl phthalate	0.1	0.1	0.1	0.1
n-Butylbenzene	0.1	0.1	NA	0.1
sec-Butylbenzene	0.1	0.1	NA	0.1
t-Butylbenzene	0.1	0.1	NA	0.1
Carbon tetrachloride	0.1	0.1	NA	0.1
a-Chlordane	0.05	0.05	0.04	0.05
g-Chlordane	0.05	0.05	0.04	0.05
4-Chloroaniline	0.1	0.1	0.1	0.1
Chlorobenzene	0.1	0.1	NA	0.1
Chloroform	0.1	0.1	NA	0.1
4-Chlorotoluene	0.1	0.1	NA	0.1
Chrysene	0.15	0.15	0.13	0.15
Isopropylbenzene	0.1	0.1	NA	0.1
p-Isopropyltoluene	0.1	0.1	NA	0.1
DDD	0.05	0.05	NA	0.05
DDE	0.05	0.05	NA	0.05
DDT	0.05	0.05	0.03	0.05
Octachlorodibenzo-p-dioxin	0.03	0.03	0.03	0.03
Di-n-butyl phthalate	0.1	0.1	0.1	0.1
Di-n-octylphthalate	0.1	0.1	0.1	0.1
Dibenz(a,h)anthracene	0.15	0.15	0.13	0.15
Dibenzofuran	0.1	0.1	NA	0.1
Dibromochloromethane	0.1	0.1	NA	0.1
1,2-Dibromo-3-chloropropane	0.1	0.1	NA	0.1
1,2-Dichlorobenzene	0.1	0.1	NA	0.1

Table 2
Absorption Fraction from Soil (ABS) Values Used in Dermal Risk Calculations

Chemical	ABS (JEG, 1997)	ABS (DTSC, 1994)	(USEPA, in preparation)	Proposed ABS
1,3-Dichlorobenzene	0.1	0.1	NA	0.1
1,4-Dichlorobenzene	0.1	0.1	NA	0.1
Dichlorodifluoromethane	0.1	0.1	NA	0.1
1,2-Dichloroethane	0.1	0.1	NA	0.1
cis-1,2-Dichloroethene	0.1	0.1	NA	0.1
1,2-Dichloropropane	0.1	0.1	NA	0.1
Dieldrin	0.05	0.05	NA	0.05
Diethyl phthalate	0.1	0.1	0.1	0.1
2,4-Dimethylphenol	0.1	0.1	0.1	0.1
2,4-Dinitrotoluene	0.1	0.1	0.1	0.1
Dioxin (2,3,7,8-TCDD)	0.03	0.03	0.03	0.03
Endrin	0.05	0.05	NA	0.05
Ethylbenzene	0.1	0.1	NA	0.1
Fluoranthene	0.15	0.15	0.13	0.15
Fluorene	0.15	0.15	0.13	0.15
Heptachlor epoxide	0.05	0.05	NA	0.05
Hexachlorobutadiene	0.1	0.1	0.1	0.1
Indeno(1,2,3-cd)pyrene	0.15	0.15	0.13	0.15
Methylene chloride	0.1	0.1	NA	0.1
2-Methylnaphthalene	0.1	0.1	0.1	0.1
2-Methylphenol	0.1	0.1	0.1	0.1
4-Methylphenol	0.1	0.1	0.1	0.1
Naphthalene	0.15	0.15	0.13	0.15
PCBs	0.15	0.15	0.14	0.15
Pentachlorodibenzofurans, Total	0.03	0.03	NA	0.03
Pentachlorophenol	0.25	0.25	0.25	0.25
Phenanthrene	0.15	0.15	0.13	0.15
Phenol	0.1	0.1	0.1	0.1
n-Propylbenzene	0.1	0.1	0.1	0.1
Pyrene	0.15	0.15	0.13	0.15
Styrene	0.1	0.1	NA	0.1
1,1,2,2-Tetrachloroethane	0.1	0.1	NA	0.1
Tetrachloroethene	0.1	0.1	NA	0.1
Toluene	0.1	0.1	NA	0.1
1,2,3-Trichlorobenzene	0.1	0.1	NA	0.1
1,2,4-Trichlorobenzene	0.1	0.1	NA	0.1
1,1,1-Trichloroethane	0.1	0.1	NA	0.1
1,1,2-Trichloroethane	0.1	0.1	NA	0.1
Trichloroethene	0.1	0.1	NA	0.1
Trichlorofluoromethane	0.1	0.1	NA	0.1
2,4,5-Trichlorophenol	0.1	0.1	NA	0.1
1,2,3-Trichloropropane	0.1	0.1	NA	0.1
1,2,4-Trimethylbenzene	0.1	0.1	NA	0.1
1,3,5-Trimethylbenzene	0.1	0.1	NA	0.1
Xylenes	0.1	0.1	NA	0.1
Vinyl chloride	0.1	0.1	NA	0.1

Note: NA = Not available

References:

Department of Toxic Substances Control (DTSC). 1994. *Preliminary Endangerment Assessment Guidance Manual.* January.

Jacobs Engineering Group (JEG). 1997. *SCOU RI/FS Part 2: Baseline Human Health Risk Assessment.* May.

U.S. Environmental Protection Agency (USEPA). In preparation. *Risk Assessment for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance. Draft.*

Table 3
Comparison of SCOU and Current Slope Factors

		EPA Oral Cancer Slope Factors				EPA Inhalation Cancer Slope Factors				California Cancer Slope Factors							
	Chemical Name	Oral SF (SCOU) (mg/kg-day)$^{-1}$	Oral Slope Factor Source	Current Oral SF (mg/kg-day)$^{-1}$	Current Oral Slope Factor Source	Inhal SF (SCOU) (mg/kg-day)$^{-1}$	Inhal SF Source	Current Inhal SF (mg/kg-day)$^{-1}$	Current Inhal Slope Factor Source	CA Oral Slope Factor (SCOU)	Current CA Oral Slope Factor	CA Inhal Slope Factor (SCOU)	Current CA Inhal Slope Factor	Max Oral Slope Factor	Max Inhalation Slope Factor	Oral Slope Factor Ratio Current/ SCOU	Inhalation Slope Factor Ratio Current/ SCOU
	Metals																
car	Arsenic	1.5E+00	IRIS	1.5E+00	IRIS	1.5E+01	IRIS	1.5E+01	IRIS		1.5E+00	1.2E+01	1.2E+01	1.5E+00	1.5E+01	1.0	1.0
car	Beryllium	4.3E+00	IRIS			8.4E+00	HEAST	8.4E+00	IRIS				8.4E+00	0.0E+00	8.4E+00		1.0
car	Cadmium		NA		NA	1.5E+01	IRIS	1.5E+01	IRIS		3.8E-01	1.5E+01	1.5E+01	3.8E-01	1.5E+01	Calc Risk	1.0
car	Lead		NA		NA		NA		NA								
car	Nickel		NA		NA								9.1E-01		9.1E-01		Calc Risk
	Organic Compounds																
car	Benzene	1.0E-01	IRIS	1.0E-01	IRIS	1.0E-01	IRIS	1.0E-01	IRIS	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.0	1.0
car	Benzo(a)anthracene	7.3E-01	TOX EQUIV	7.3E-01	TOX EQUIV	7.3E-01	ROUTE	7.3E-01	ROUTE	1.2E+00	1.2E+00	3.9E-01	3.9E-01	1.2E+00	7.3E-01	1.0	1.0
car	Benzo(a)pyrene	7.3E+00	IRIS	7.3E+00	IRIS	7.3E+00	ROUTE	7.3E+00	ROUTE	1.2E+01	1.2E+01	3.9E+00	3.9E+00	1.2E+01	7.3E+00	1.0	1.0
car	Benzo(b) fluoranthene	7.3E-01	TOX EQUIV	7.3E-01	TOX EQUIV	7.3E-01	ROUTE	7.3E-01	ROUTE	1.2E+00	1.2E+00	3.9E-01	3.9E-01	1.2E+00	7.3E-01	1.0	1.0
car	Benzo(k) fluoranthene	7.3E-01	TOX EQUIV	7.3E-01	TOX EQUIV	7.3E-01	ROUTE	7.3E-01	ROUTE	1.2E+00	1.2E+00	3.9E-01	3.9E-01	1.2E+00	7.3E-01	1.0	1.0
car	Bis(2-ethylhexyl) phthalate	1.4E-02	IRIS	1.4E-02	IRIS	1.4E-02	ROUTE	1.4E-02	ROUTE	8.4E-03	3.0E-03	8.4E-03	8.4E-03	1.4E-02	1.4E-02	1.0	1.0
car	Bromodichloro-methane	1.3E-01	IRIS	1.3E-01	IRIS	1.3E-01	ROUTE	1.3E-01	ROUTE	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.0	1.0
car	Bromoform	7.9E-03	IRIS	7.9E-03	IRIS	3.9E-03	HEAST	3.9E-03	IRIS					7.9E-03	3.9E-03	1.0	1.0
car	Carbon tetrachloride	1.3E-01	IRIS	1.3E-01	IRIS	5.3E-02	IRIS	5.3E-02	IRIS		1.5E-01		1.5E-01	1.5E-01	1.5E-01	1.2	2.8
car	α-Chlordane	1.3E+00	IRIS	3.5E-01	IRIS	1.3E+00	HEAST	3.5E-01	IRIS	1.2E+00	1.3E+00	1.2E+00	1.2E+00	1.3E+00	1.2E+00	1.0	0.9
car	γ-Chlordane	1.3E+00	IRIS	3.5E-01	IRIS	1.3E+00	HEAST	3.5E-01	IRIS	1.2E+00	1.3E+00	1.2E+00	1.2E+00	1.3E+00	1.2E+00	1.0	0.9
car	Chloroform	6.1E-03	IRIS	6.1E-03	IRIS	8.0E-02	HEAST	8.0E-02	IRIS		3.1E-02		1.9E-02	3.1E-02	8.0E-02	5.1	1.0
car	Chrysene	7.3E-02	TOX EQUIV	7.3E-02	TOX EQUIV	7.3E-02	ROUTE	3.1E-03	PEF	1.2E-01	1.2E-01	3.9E-02	3.9E-02	1.2E-01	3.9E-02	1.0	0.5
car	DDD	2.4E-01	IRIS/ CAL EPA	2.4E-01	IRIS/ CAL EPA	2.4E-01	ROUTE	2.4E-01	ROUTE	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	1.0	1.0
car	DDE	3.4E-01	IRIS/ CAL EPA	3.4E-01	IRIS/ CAL EPA	3.4E-01	ROUTE	3.4E-01	ROUTE	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	1.0	1.0
car	DDT	3.4E-01	IRIS	3.4E-01	IRIS	3.4E-01	HEAST	3.4E-01	IRIS	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	1.0	1.0
car	1,2,3,4,6,7,8-Heptachlorodi-benzofuran	1.5E+03	TOX EQUIV	1.5E+03	TOX EQUIV	1.5E+03	ROUTE	1.5E+03	ROUTE	1.3E+03	--	1.3E+03	1.3E+03	1.5E+03	1.5E+03	1.0	1.0

Table 3
Comparison of SCOU and Current Slope Factors

		EPA Oral Cancer Slope Factors				EPA Inhalation Cancer Slope Factors				California Cancer Slope Factors							
	Chemical Name	Oral SF (SCOU) (mg/kg-day)$^{-1}$	Oral Slope Factor Source	Current Oral SF (mg/kg-day)$^{-1}$	Current Oral Slope Factor Source	Inhal SF (SCOU) (mg/kg-day)$^{-1}$	Inhal SF Source	Current Inhal SF (mg/kg-day)$^{-1}$	Current Inhal Slope Factor Source	CA Oral Slope Factor (SCOU)	Current CA Oral Slope Factor	CA Inhal Slope Factor (SCOU)	Current CA Inhal Slope Factor	Max Oral Slope Factor	Max Inhalation Slope Factor	Oral Slope Factor Ratio Current/ SCOU	Inhalation Slope Factor Ratio Current/ SCOU
car	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.5E+03	TOX EQUIV	1.5E+03	TOX EQUIV	1.5E+03	ROUTE	1.5E+03	ROUTE	1.3E+03	--	1.3E+03	1.3E+03	1.5E+03	1.5E+03	1.0	1.0
car	Octachlorodibenzo-p-dioxin	1.5E+02	TOX EQUIV	1.5E+02	TOX EQUIV	1.5E+02	ROUTE	1.5E+02	ROUTE	1.3E+02	--	1.3E+02	1.3E+02	1.5E+02	1.5E+02	1.0	1.0
car	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)			1.50E+05	HEAST			1.50E+05	HEAST		1.3E+05		1.3E+05	1.5E+05	1.5E+05		
car	Dibenz(a,h)-anthracene	7.3E+00	TOX EQUIV	7.3E+00	TOX EQUIV	7.3E+00	ROUTE	3.1E+00	PEF	4.1E+00	4.1E+00	4.1E+00	4.1E+00	7.3E+00	4.1E+00	1.0	0.6
car	1,2-Dibromo-3-chloropropane	1.4E+00	HEAST	1.4	HEAST	2.4E-03	HEAST	2.4E-03	HEAST		7.0E+00		7.0E+00	7.0E+00	7.0E+00	5.0	2916.7
car	Dibromochloromethane	8.4E-02	IRIS	8.4E-02	IRIS	8.4E-02	ROUTE	8.4E-02	ROUTE		9.4E-02		9.4E-02	9.4E-02	9.4E-02	1.1	1.1
car	1,4-Dichlorobenzene	4.0E-02	HEAST	2.4E-02	HEAST	4.0E-02	ROUTE	2.4E-02	ROUTE	4.0E-02	5.4E-03	4.0E-02	4.0E-02	2.4E-02	4.0E-02	0.6	1.0
car	1,1-Dichloroethane	5.7E-03	NA	5.7E-03	NA	5.7E-03	NA	5.7E-03	NA	5.7E-03	5.7E-03	5.7E-03	5.7E-03	5.7E-03	5.7E-03	1.0	1.0
car	1,2-Dichloroethane	9.1E-02	IRIS	9.1E-02	IRIS	9.1E-02	HEAST	9.1E-02	IRIS	7.0E-02	4.7E-02	7.0E-02	7.0E-02	9.1E-02	9.1E-02	1.0	1.0
car	1,1-Dichloroethene	6.0E-01	IRIS	6.0E-01	IRIS	1.8E-01	HEAST	1.8E-01	HEAST					6.0E-01	1.8E-01	1.0	1.0
car	1,2-Dichloropropane	6.8E-02	HEAST	6.8E-02	HEAST	6.8E-02	ROUTE	6.8E-02	ROUTE	6.3E-02	3.6E-02	6.3E-02	3.6E-02	6.8E-02	6.8E-02	1.0	1.0
car	Dieldrin	1.6E+01	IRIS	1.6E+01	IRIS	1.6E+01	HEAST	1.6E+01	IRIS	1.6E+01	1.6E+01	1.6E+01	1.6E+01	1.6E+01	1.6E+01	1.0	1.0
car	2,4-Dinitrotoluene		IRIS		IRIS		NA		NA	3.1E-01	3.1E-01	3.1E-01	3.1E-01	3.1E-01	3.1E-01	1.0	1.0
car	Heptachlor epoxide	9.1E+00	IRIS	9.1E+00	IRIS	9.1E+00	HEAST	9.1E+00	IRIS		5.50E+00		5.5E+00	9.1E+00	9.1E+00	1.0	1.0
car	Hexachlorobutadiene	7.8E-02	IRIS	7.8E-02	IRIS	7.8E-02	HEAST	7.8E-02	IRIS					7.8E-02	7.8E-02	1.0	1.0
car	Indeno(1,2,3-c,d)pyrene	7.3E-01	TOX EQUIV	7.3E-01	TOX EQUIV	7.3E-01	ROUTE	7.3E-01	ROUTE	1.2E+00	1.2E+00	3.9E-01	3.9E-01	1.2E+00	7.3E-01	1.0	1.0
car	Methylene chloride	1.4E-02	IRIS	7.5E-03	IRIS	3.5E-03	IRIS		NA	1.4E-02	1.4E-02	3.5E-03	3.5E-03	1.4E-02	3.5E-03	1.0	1.0
car	2-Methylphenol		IRIS		IRIS		IRIS		IRIS								
car	4-Methylphenol		IRIS		IRIS		IRIS		IRIS								
car	PCBs	7.7E+00	IRIS	2.0E+00	IRIS	7.7E+00	ROUTE	2.0E+00	ROUTE		5.0E+00		2.0E+00	5.0E+00	2.0E+00	0.6	0.3
car	Pentachlorophenol	1.2E-01	IRIS (1992)	1.2E-01	IRIS	1.2E-01	ROUTE	1.2E-01	ROUTE	1.8E-02	8.1E-02	1.8E-02	1.8E-02	1.2E-01	1.2E-01	1.0	1.0
car	1,1,2,2-Tetrachloroethane	2.0E-01		2.6E-02	IRIS	2.0E-01	IRIS	2.6E-02	ROUTE	2.7E-01	2.7E-01	2.7E-01	2.0E-01	2.7E-01	2.0E-01	1.0	0.7
car	Tetrachloroethene	5.1E-02	ECAO	5.2E-02	NCEA	2.1E-03	ECAO	2.1E-03	NCEA	5.1E-02	5.1E-02	2.1E-02	2.1E-02	5.2E-02	2.1E-02	1.0	1.0
car	1,2,4-Trichlorobenzene		NA		NA		NA		NA		3.6E-03			3.6E-03		Calc Risk	

Table 3
Comparison of SCOU and Current Slope Factors

		EPA Oral Cancer Slope Factors				EPA Inhalation Cancer Slope Factors				California Cancer Slope Factors							
	Chemical Name	Oral SF (SCOU) (mg/kg-day)$^{-1}$	Oral Slope Factor Source	Current Oral SF (mg/kg-day)$^{-1}$	Current Oral Slope Factor Source	Inhal SF (SCOU) (mg/kg-day)$^{-1}$	Inhal SF Source	Current Inhal SF (mg/kg-day)$^{-1}$	Current Inhal Slope Factor Source	CA Oral Slope Factor (SCOU)	Current CA Oral Slope Factor	CA Inhal Slope Factor (SCOU)	Current CA Inhal Slope Factor	Max Oral Slope Factor	Max Inhalation Slope Factor	Oral Slope Factor Ratio Current/ SCOU	Inhalation Slope Factor Ratio Current/ SCOU
car	1,1,2-Trichloroethane	5.7E-02	IRIS	5.7E-02	IRIS	5.7E-02	HEAST	5.7E-02	IRIS		7.2E-02		5.7E-02	7.2E-02	5.7E-02	1.3	1.0
car	Trichloroethene	1.5E-02	REGION IX (ECAO)	1.5E-02	REGION IX (ECAO)	1.0E-02	REGION IX (ECAO)	6.0E-03	REGION IX (NCEA)	1.5E-02	1.5E-02	1.0E-02	1.0E-02	1.5E-02	1.0E-02	1.0	1.0
car	1,2,3-Trichloropropane	7.0E+00	HEAST	7.0E+00	HEAST	7.0E+00	ROUTE	7.0E+00	ROUTE					7.0E+00	7.0E+00	1.0	1.0
car	Vinyl chloride			1.50E+00	IRIS			1.60E-02	IRIS		2.70E-01		2.7E-01	1.5E+00	2.7E-01	CalcRisk	CalcRisk

Notes

SF_O	Oral cancer slope factor
SF_i	Inhalation cancer slope factor
IRIS	Integrated Risk Information System
HEAST	Health Effects Assessment Summary Tables
REGION IX (NCEA)	National Center for Environmental Assessment
REGION IX (ECAO)	Environment Criteria and Assessment Office
TOX EQUIV	Toxicity Equivalency Factor
ROUTE	Indicates that the value is a direct extrapolation from the published oral or inhalation value

Table 4
Revised Slope Factors for Carcinogens

No.	COC	SCOU BHHRA Factor {Oral (O) and Inhalation (I)}	Revised Factor {Oral (O) and Inhalation (I)}	Ratio of Revised Factor and SCOU Factor
1	Cadmium		3.8E-01 (O)	New
2	Nickel		9.1E-01 (I)	New
3	Carbon Tetrachloride	1.3E-01 (O) 5.3E-02 (I)	1.5E-01 (O) 1.5E-01 (I)	1.2 2.8
4	α-Chlordane	1.3E+00 (I)	1.2E+00 (I)	0.9
5	γ-Chlordane	1.3E+00 (I)	1.2E+00 (I)	0.9
6	Chloroform	6.1E-03 (O)	3.1E-02 (O)	5.1
7	Chrysene	7.3E-02 (I)	3.9E-02 (I)	0.5
8	Pentachlorodibenzofurans		6.5E+03	New
9	Dibenz(a,h)-anthracene	7.3E+00 (I)	4.1E+00 (I)	0.6
10	1,2-Dibromo-3-chloropropane	1.4E+00 (O) 2.4E-03 (I)	7.0E+00 (O) 7.0E+00 (I)	5.0 2917
11	Dibromochloromethane	8.4E-02 (O) 8.4E-02 (I)	9.4E-02 (O) 9.4E-02 (I)	1.1 1.1
12	1,4-Dichlorobenzene	4.0E-02 (O)	2.4E-02 (O)	0.6
13	PCBs	7.7E+00 (O) 7.7E+00 (I)	5.0E+00 (O) 2.0E+00 (I)	0.6 0.3
14	1,1,2,2-Tetrachloroethane	2.7E-01 (I)	2.0E-01 (I)	0.7
15	1,2,4-Triclorobenzene		3.6E-03 (O)	New
16	1,1,2-Trichloroethane	5.7E-02 (O)	7.2E-02 (O)	1.3
17	Vinyl Chloride		1.5E+00 (0)	New

Note

Shaded COCs will result in increased cancer risk.

Table 5
Comparison of SCOU and Current Reference Doses

		Chronic Oral RfD Values					Chronic Inhalation RfD Values					
	Chemical Name	Chronic Oral RfD (SCOU) mg/kg-day	Chronic Oral RfD Source	Current Chronic Oral RfD mg/kg-day	Current Chronic Oral RfD Source	Chronic Inhal RfC (mg/m3)	Chronic Inhal RfD (SCOU) mg/kg-day	Chronic Inhal RfD Source	Current Chronic Inhal RfD mg/kg-day	Current Chronic Inhal RfD Source	Oral Ref. Dose Ratio SCOU/ Current	Inhalation Ref. Dose Ratio SCOU/ Current
	Metals											
	Aluminum	1.0E+00	ECAO	1.0E+00	NCEA				1.4E-03	NCEA	1.0	Calc HI
	Antimony	4.0E-04	IRIS	4.0E-04	IRIS			NA		NA	1.0	1.0
car	Arsenic	3.0E-04	IRIS	3.0E-04	IRIS			NA		NA	1.0	1.0
	Barium	7.0E-02	IRIS	7.0E-02	IRIS	5.0E-04	1.4E-04	HEAST	1.4E-04	HEAST	1.0	1.0
car	Beryllium	5.0E-03	IRIS	2.0E-03	IRIS			NA	5.7E-06	IRIS	2.5	Calc HI
	Boron	9.0E-02	IRIS	9.0E-02	IRIS	2.0E-02	5.7E-03	HEAST	5.7E-03	HEAST	1.0	1.0
car	Cadmium	1.0E-03	IRIS	5.0E-04	IRIS			NA			2.0	1.0
	Calcium											
	Chromium	1.0E+00	IRIS	1.5E+00	IRIS			NA		NA	0.7	1.0
	Cobalt	6.0E-02	ECAO	6.0E-02	ECAO		2.9E-04	ECAO	N/A		1.0	N/A
	Copper	3.7E-02	HEAST	3.7E-02	HEAST			NA		NA	1.0	1.0
	Iron											
car	Lead											
	Magnesium											
	Manganese	1.4E-01	IRIS	2.4E-02	IRIS	5.0E-05	1.4E-05	IRIS	1.4E-05	IRIS	5.8	1.0
	Mercury	3.0E-04	HEAST	3.0E-04	HEAST	3.0E-04	8.6E-05	HEAST	8.6E-05	HEAST	1.0	1.0
	Molybdenum	5.0E-03	IRIS	5.0E-03	IRIS						1.0	1.0
car	Nickel	2.0E-02	IRIS	2.0E-02	IRIS			NA		NA	1.0	1.0
	Potassium											
	Selenium	5.0E-03	IRIS	5.0E-03	IRIS			NA		NA	1.0	1.0
	Silica											
	Silver	5.0E-03	IRIS	5.0E-03	IRIS			NA		NA	1.0	1.0
	Sodium											
	Thallium	8.0E-05	IRIS	6.6E-05	IRIS			NA		NA	1.2	1.0
	Vanadium	7.0E-03	HEAST	7.0E-03	HEAST			NA		NA	1.0	1.0
	Zinc	3.0E-01	IRIS	3.0E-01	IRIS			NA		NA	1.0	1.0
	Organic Compounds											
	Acenaphthene	6.0E-02	IRIS	6.0E-02	IRIS		6.0E-02	ROUTE	6.0E-02	ROUTE	1.0	1.0
	Acenaphthylene							NA		NA		
	Anthracene	3.0E-01	IRIS	3.0E-01	IRIS		3.0E-01	ROUTE	3.0E-01	ROUTE	1.0	1.0
car	Benzene	1.7E-03	ROUTE	3.0E-03	NCEA		1.7E-03	NCEA	1.7E-03	NCEA	0.6	1.0
car	Benzo(a)anthracene		NA		NA			NA		NA		
car	Benzo(a)pyrene		NA		NA			NA		NA		

Table 5
Comparison of SCOU and Current Reference Doses

		Chronic Oral RfD Values					Chronic Inhalation RfD Values					
	Chemical Name	Chronic Oral RfD (SCOU) mg/kg-day	Chronic Oral RfD Source	Current Chronic Oral RfD mg/kg-day	Current Chronic Oral RfD Source	Chronic Inhal RfC (mg/m3)	Chronic Inhal RfD (SCOU) mg/kg-day	Chronic Inhal RfD Source	Current Chronic Inhal RfD mg/kg-day	Current Chronic Inhal RfD Source	Oral Ref. Dose Ratio SCOU/ Current	Inhalation Ref. Dose Ratio SCOU/ Current
car	Benzo(b) fluoranthene		NA		NA			NA		NA		
	Benzo(g,h,i) perylene		NA		NA			NA		NA		
car	Benzo(k) fluoranthene		NA		NA			NA		NA		
car	Bis(2-ethylhexyl) phthalate	2.0E-02	IRIS	2.0E-02	IRIS		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
	Bromochloro-methane		NA	6.0E-02	Surrogate[1]				8.6E-01	Surrogate[1]	Calc HI	Calc HI
car	Bromodichloro-methane	2.0E-02	IRIS	2.0E-02	IRIS		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
car	Bromoform	2.0E-02	IRIS	2.0E-02	IRIS		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
	2-Butanone	6.0E-01	IRIS	6.0E-01	IRIS	1.0E+00	1.0E+00	IRIS	1.0E+00	IRIS	1.0	1.0
car	Butyl benzyl phthalate	2.0E-01	IRIS	2.0E-01	IRIS		2.0E-01	ROUTE	2.0E-01	ROUTE	1.0	1.0
	n-Butylbenzene		NA	1.0E-02	NCEA			NA	1.0E-02	ROUTE	Calc HI	Calc HI
	sec-Butylbenzene		NA	1.0E-02	NCEA			NA	1.0E-02	ROUTE	Calc HI	Calc HI
	t-Butylbenzene		NA	1.0E-02	NCEA			NA	1.0E-02	ROUTE	Calc HI	Calc HI
car	Carbon tetrachloride	7.0E-04	IRIS	7.0E-04	IRIS		5.7E-04	ECAO	7.0E-04	ROUTE	1.0	0.8
car	α-Chlordane	6.0E-05	IRIS	5.0E-04	IRIS		6.0E-05	ROUTE	2.0E-04	IRIS	0.1	0.3
car	γ-Chlordane	6.0E-05	IRIS	5.0E-04	IRIS		6.0E-05	ROUTE	2.0E-04	IRIS	0.1	0.3
	4-Chloroaniline	4.0E-03	IRIS	4.0E-03	IRIS		4.0E-03	ROUTE	4.0E-03	ROUTE	1.0	1.0
	Chlorobenzene	2.0E-02	IRIS	2.0E-02	IRIS	2.0E-02	5.7E-03	ECAO	1.7E-02	NCEA	1.0	0.3
car	Chloroform	1.0E-02	IRIS	1.0E-02	IRIS		1.0E-02	ROUTE	8.6E-05	NCEA	1.0	116.3
	4-Chlorotoluene											
car	Chrysene			3.0E-02	Surrogate[2]				3.0E-02	Surrogate2	Calc HI	Calc HI
	Isopropylbenzene	4.0E-02	IRIS	1.0E-01	IRIS	9.0E-03	2.6E-03	HEAST	1.1E-01	IRIS	0.4	0.02
	Isopropyltoluene		NA	1.0E-01	Surrogate[3]			NA	1.1E-01	Surrogate[3]	Calc HI	Calc HI
car	DDD		NA	5.0E-04	Surrogate[4]			NA	5.0E-04	Surrogate[4]	Calc HI	Calc HI
car	DDE		NA	5.0E-04	Surrogate[5]			NA	5.0E-04	Surrogate[5]	Calc HI	Calc HI
car	DDT	5.0E-04	IRIS	5.0E-04	IRIS		5.0E-04	ROUTE	5.0E-04	ROUTE	1.0	1.0
	Heptachlorodi-benzo-p-dioxins, total											
car	1,2,3,4,6,7,8-Heptachlorodi-benzofuran	1.0E-07	TOX EQUIV	1.0E-07	TOX EQUIV		1.0E-07	ROUTE	1.0E-07	ROUTE	1.0	1.0
	Heptachloro-dibenzofurans, total											

Table 5
Comparison of SCOU and Current Reference Doses

		Chronic Oral RfD Values					Chronic Inhalation RfD Values					
	Chemical Name	Chronic Oral RfD (SCOU) mg/kg-day	Chronic Oral RfD Source	Current Chronic Oral RfD mg/kg-day	Current Chronic Oral RfD Source	Chronic Inhal RfC (mg/m3)	Chronic Inhal RfD (SCOU) mg/kg-day	Chronic Inhal RfD Source	Current Chronic Inhal RfD mg/kg-day	Current Chronic Inhal RfD Source	Oral Ref. Dose Ratio SCOU/ Current	Inhalation Ref. Dose Ratio SCOU/ Current
car	1,2,3,4,6,7,8-Heptachlorodi-benzo-p-dioxin	1.0E-07	TOX EQUIV	1.0E-07	TOX EQUIV		1.0E-07	ROUTE	1.0E-07	ROUTE	1.0	1.0
	Hexachlorodi-benzo-p-dioxins, total											
car	Octachlorodi-benzo-p-dioxin	1.0E-06	TOX EQUIV	1.0E-06	TOX EQUIV		1.0E-06	ROUTE	1.0E-06	ROUTE	1.0	1.0
	Pentachlorodi-benzo-furans, total											
car	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)											
	Tetrachlorodi-benzo-p-dioxins, total											
	Tetrachlorodi-benzofurans, total											
	Di-*n*-butyl phthalate	1.0E-01	IRIS	1.0E-01	IRIS		1.0E-01	ROUTE	1.0E-01	ROUTE	1.0	1.0
	Di-*n*-octylphthalate	2.0E-02	HEAST	2.0E-02	HEAST		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
car	Dibenz(a,h)-anthracene		NA	3.0E-02	Surrogate[6]			NA	3.0E-02	Surrogate[6]	Calc HI	Calc HI
	Dibenzofuran		NA	4.0E-03	NCEA			NA	4.0E-03	ROUTE	Calc HI	Calc HI
car	1,2-Dibromo-3-chloropropane	5.7E-05	ROUTE	5.7E-05	ROUTE	2.0E-04	5.7E-05	IRIS	5.71E-05	IRIS	1.0	1.0
car	Dibromochloro-methane	2.0E-02	IRIS	2.0E-02	IRIS		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
	1,2-Dichlorobenzene	9.0E-02	IRIS	9.0E-02	IRIS	2.0E-01	9.0E-02	ROUTE	5.7E-02	HEAST	1.0	1.6
	1,3-Dichlorobenzene			9.0E-04	NCEA			NA	9.0E-04	ROUTE	Calc HI	Calc HI
car	1,4-Dichlorobenzene	2.3E-01	ROUTE	3.0E-02	IRIS	8.0E-01	2.3E-01	IRIS	2.3E-01	IRIS	7.7	1.0
	Dichlorodifluoromethane			2.0E-01	IRIS				5.7E-02	HEAST	Calc HI	Calc HI
car	1,1-Dichloroethane	1.0E-01	HEAST	1.0E-01	HEAST	5.0E-01	1.4E-01	HEAST	1.4E-01	HEAST	1.0	1.0
car	1,2-Dichloroethane		NA	3.0E-02	NCEA			NA	1.4E-03	NCEA	Calc HI	Calc HI
car	1,1-Dichloroethene	9.0E-03	IRIS	9.0E-03	IRIS		9.0E-03	ROUTE	9.0E-03	ROUTE	1.0	1.0
	cis-1,2-Dichloroethene	1.0E-02	HEAST	1.0E-02	HEAST		1.0E-02	ROUTE	1.0E-02	ROUTE	1.0	1.0
car	1,2-Dichloropropane	1.1E-03	ROUTE	1.1E-03	ROUTE	4.0E-03	1.1E-03	IRIS	1.1E-03	IRIS	1.0	1.0
car	Dieldrin	5.0E-05	IRIS	5.0E-05	IRIS		5.0E-05	ROUTE	5.0E-05	ROUTE	1.0	1.0
	Diethyl phthalate	8.0E-01	IRIS	8.0E-01	IRIS		8.0E-01	ROUTE	8.0E-01	ROUTE	1.0	1.0
	2,4-Dimethylphenol	2.0E-02	IRIS	2.0E-02	IRIS		2.0E-02	ROUTE	2.0E-02	ROUTE	1.0	1.0
	2,4-Dinitrophenol	2.0E-03	IRIS	2.0E-03	IRIS		2.0E-03	ROUTE	2.0E-03	ROUTE	1.0	1.0
car	2,4-Dinitrotoluene	2.0E-03	IRIS	2.0E-03	IRIS		2.0E-03	ROUTE	2.0E-03	ROUTE	1.0	1.0
	Endrin	3.0E-04	IRIS	3.0E-04	IRIS		3.0E-04	ROUTE	3.0E-04	ROUTE	1.0	1.0

Table 5
Comparison of SCOU and Current Reference Doses

		Chronic Oral RfD Values					Chronic Inhalation RfD Values					
	Chemical Name	Chronic Oral RfD (SCOU) mg/kg-day	Chronic Oral RfD Source	Current Chronic Oral RfD mg/kg-day	Current Chronic Oral RfD Source	Chronic Inhal RfC (mg/m3)	Chronic Inhal RfD (SCOU) mg/kg-day	Chronic Inhal RfD Source	Current Chronic Inhal RfD mg/kg-day	Current Chronic Inhal RfD Source	Oral Ref. Dose Ratio SCOU/ Current	Inhalation Ref. Dose Ratio SCOU/ Current
	Ethylbenzene	1.0E-01	IRIS	1.0E-01	IRIS	1.0E+00	2.9E-01	IRIS	2.9E-01	IRIS	1.0	1.0
	Fluoranthene	4.0E-02	IRIS	4.0E-02	IRIS		4.0E-02	ROUTE	4.0E-02	ROUTE	1.0	1.0
	Fluorene	4.0E-02	IRIS	4.0E-02	IRIS		4.0E-02	ROUTE	4.0E-02	ROUTE	1.0	1.0
car	Heptachlor epoxide	1.3E-05	IRIS	1.3E-05	IRIS		1.3E-05	ROUTE	1.3E-05	ROUTE	1.0	1.0
car	Hexachlorobutadiene	2.0E-04	HEAST	3.0E-04	HEAST		2.0E-04	ROUTE	3.0E-04	ROUTE	0.7	0.7
car	*Indeno(1,2,3-c,d)pyrene*		NA	3.0E-02	*Surrogate*[7]			NA	3.0E-02	*Surrogate*[7]	Calc HI	Calc HI
car	Methylene chloride	6.0E-02	IRIS	6.0E-02	IRIS	3.0E+00	8.6E-01	HEAST	8.6E-01	HEAST	1.0	1.0
	2-Methyl-naphthalene		NA	2.0E-02	Surrogate[8]			NA	8.6E-04	Surrogate[8]	Calc HI	Calc HI
car	2-Methylphenol	5.0E-02	IRIS	5.0E-02	IRIS		5.0E-02	ROUTE	5.0E-02	ROUTE	1.0	1.0
car	4-Methylphenol	5.0E-03	HEAST	5.0E-03	HEAST		5.0E-03	ROUTE	5.0E-03	ROUTE	1.0	1.0
	Naphthalene	4.0E-02	ECAO	2.0E-02	IRIS		4.0E-02	ROUTE	8.6E-04	IRIS	2.0	46.5
car	PCBs	2.0E-05	IRIS	2.0E-05	IRIS		2.0E-05	ROUTE	2.0E-05	ROUTE	1.0	1.0
car	Pentachloro-phenol	3.0E-02	IRIS	3.0E-02	IRIS		3.0E-02	ROUTE	3.0E-02	ROUTE	1.0	1.0
	Phenanthrene		NA	3.0E-02	Surrogate[9]			NA	3.0E-02	Surrogate[9]	Calc HI	Calc HI
	Phenol	6.0E-01	IRIS	6.0E-01	IRIS		6.0E-01	ROUTE	6.0E-01	ROUTE	1.0	1.0
	n-Propylbenzene		NA		NA			NA		NA	1.0	1.0
	Pyrene	3.0E-02	IRIS	3.0E-02	IRIS		3.0E-02	ROUTE	3.0E-02	ROUTE	1.0	1.0
	Styrene	2.0E-01	IRIS	2.0E-01	IRIS	1.0E+00	2.9E-01	IRIS	2.9E-01	IRIS	1.0	1.0
car	1,1,2,2-Tetrachloro-ethane			6.0E-02	IRIS			NA	6.0E-02	ROUTE	Calc HI	Calc HI
car	Tetrachloroethene	1.0E-02	IRIS	1.0E-02	IRIS		1.0E-02	ROUTE	1.1E-01	NCEA	1.0	0.1
	Toluene	2.0E-01	IRIS	2.0E-01	IRIS	4.0E-01	1.1E-01	IRIS	1.1E-01	IRIS	1.0	1.0
	1,2,3-Trichlorobenzene		NA		NA			NA		NA		
car	1,2,4-Trichlorobenzene	1.0E-02	IRIS	1.0E-02	IRIS	9.0E-03	1.0E-02	ROUTE	5.7E-02	ROUTE	1.0	0.2
	1,1,1-Trichloroethane			2.0E-02	NCEA				2.0E-01	NCEA	Calc HI	Calc HI
car	1,1,2-Trichloroethane	4.0E-03	IRIS	4.0E-03	IRIS		4.0E-03	ROUTE	4.0E-03	ROUTE	1.0	1.0
car	Trichloroethene	6.0E-03	ECAO	6.0E-03	NCEA(a)		6.0E-03	ROUTE	6.0E-03	ROUTE	1.0	1.0
	Trichloro-fluoromethane	3.0E-01	IRIS	3.0E-01	IRIS	7.0E-01	2.0E-01	HEAST	2.0E-01	HEAST	1.0	1.0
	2,4,5-Trichlorophenol	1.0E-01	IRIS	1.0E-01	IRIS		1.0E-01	ROUTE	1.0E-01	ROUTE	1.0	1.0
car	1,2,3-Trichloropropane	6.0E-03	IRIS	6.0E-03	IRIS		6.0E-03	ROUTE	6.0E-03	ROUTE	1.0	1.0
	1,2,4-Trimethylbenzene		NA	5.0E-02	NCEA			NA	1.7E-03	NCEA	Calc HI	Calc HI
	1,3,5-Trimethylbenzene		NA	5.0E-02	NCEA			NA	1.7E-03	ROUTE	Calc HI	Calc HI
car	Vinyl chloride			3.0E-03	IRIS				2.9E-02	IRIS	Calc HI	Calc HI

Table 5
Comparison of SCOU and Current Reference Doses

		Chronic Oral RfD Values					Chronic Inhalation RfD Values					
	Chemical Name	Chronic Oral RfD (SCOU) mg/kg-day	Chronic Oral RfD Source	Current Chronic Oral RfD mg/kg-day	Current Chronic Oral RfD Source	Chronic Inhal RfC (mg/m3)	Chronic Inhal RfD (SCOU) mg/kg-day	Chronic Inhal RfD Source	Current Chronic Inhal RfD mg/kg-day	Current Chronic Inhal RfD Source	Oral Ref. Dose Ratio SCOU/ Current	Inhalation Ref. Dose Ratio SCOU/ Current
	Xylenes	2.0E+00	IRIS	2.0E+00	IRIS		2.0E+00	IRIS	2.0E-01	IRIS-(a)	1.0	10

Notes:

[a] RfD withdrawn

RfD_O	Oral reference dose
RfD_i	Inhalation reference dose
ECAO	Environmental Criteria and Assessment Office
IRIS	Integrated Risk Information System
HEAST	Health Effects Assessment Summary Tables
NCEA	National Center for Environmental Assessment, US EPA
NA	Not available
TOX EQUIV	Toxicity equivalency factor
ROUTE	Indicates that the value is a direct extrapolation from the published oral or inhalation value
Surrogate	Indicates that a surrogate compound was used to obtain RfDs

Surrogate Values for RFDs

Analyte	Surrogate
[1] Bromocholromethane	Dichloromethane
[2] Chrysene	Pyrene
[3] Isopropyltoluene	Butylbenzene
[4] DDD	DDT
[5] DDE	DDT
[6] Dibenz(a,h)anthracene	Pyrene
[7] Indeno(1,2,3-c,d)purene	Pyrene
[8] 2-Methylnaphthalene	Naphthalene
[9] Phenanthrene	Pyrene

Table 6
Revised Reference Doses

No.	COC	SCOU BHHRA RfD{Oral (O) and Inhalation (I)}	Revised RfD {Oral (O) and Inhalation (I)}	Ratio of SCOU RfD and Revised RfD
1	Aluminum		1.4E-03 (I)	New
2	Beryllium	5.0E-03 (O)	2.0E-03 (O) 5.7E-06 (I)	2.5 New
3	Cadmium	1.0E-03 (O)	5.0E-04 (O) 5.7E-06 (I)	2.0 New
4	Chromium	1.0E+00 (O)	1.5E+00 (O)	0.7
5	Cobalt	2.9E-04 (I)	Deleted	New
6	Manganese	1.4E-01 (O)	2.4E-02 (I)	5.8
7	Thallium	8.0E-05 (O)	6.6E-05 (O)	1.2
8	Benzene	1.7E-03 (O)	3.0E-03 (O)	0.6
9	Bromochloromethane		6.0E-02 (O) 8.6E-01 (I)	New New
10	N Butylbenzene		1.0E-02 (O) 1.0E-02 (I)	New New
11	Sec-Butylbenzene		1.0E-02 (O) 1.0E-02 (I)	New New
12	t-Butylbenzene		1.0E-02 (O) 1.0E-02 (I)	New New
13	Carbon Tetrachloride	5.7E-04 (I)	7.0E-04 (I)	0.8
14	α-Chlordane	6.0E-05 (O) 6.0E-05 (I)	5.0E-04 (O) 2.0E-04 (I)	0.1 0.3
15	γ-Chlordane	6.0E-05 (O) 6.0E-05 (I)	5.0E-04 (O) 2.0E-04 (I)	0.1 0.3
16	Chlorobenzene	5.7E-03 (I)	1.7E-02 (I)	0.3
17	Chloroform	1.0E-02 (I)	8.6E-05 (I)	116
18	Chrysene		3.0E-02 (O) 3.0E-02 (I)	New New
19	Isopropylbenzene	4.0E-02 (O) 2.6E-03 (I)	1.0E-01 (O) 1.1E-01 (I)	0.4 0.02
20	Isopropyltoluene		1.0E-01 (O) 1.1E-01 (I)	New New
21	DDD		5.0E-04 (O) 5.0E-04 (I)	New New
22	DDE		5.0E-04 (O) 5.0E-04 (I)	New New
23	Dibenz(a,h)-anthracene		3.0E-02 (O) 3.0E-02 (I)	New New
24	Dibenzofuran		4.0E-03 (O) 4.0E-03 (I)	New New
25	1,2-Dichlorobenzene	9.0E-02 (I)	5.7E-02 (I)	1.6
26	1,3-Dichlorobenzene		9.0E-04 (O) 9.0E-04 (I)	New New
27	1,4-Dichlorobenzene	2.3E-01 (O)	3.0E-02 (O)	7.7
28	Dichlorodifluoromethane		2.0E-01 (O) 5.7E-07 (I)	New New
29	1,2-Dichloroethane		3.0E-02 (O) 1.4E-03 (I)	New New
30	Hexachlorobutadiene	2.0E-04 (O) 2.0E-04 (I)	3.0E-04 (O) 3.0E-04 (I)	0.7 0.7
31	Indeno(1,2,3-c,d)pyrene		3.0E-02 (O) 3.0E-02 (I)	New New
32	2-Methyl-naphthalene		2.0E-02 (O) 8.6E-04 (I)	New New
33	Naphthalene	4.0E-02 (O) 4.0E-02 (I)	2.0E-02 (O) 8.6E-04 (O)	2 46.5
34	Phenanthrene		3.0E-02 (O) 3.0E-02 (I)	New New
35	1,1,2,2-Tetrachloroethane		6.0E-02 (O) 6.0E-02 (I)	New New
36	Tetrachloroethylene	1.0E-02 (I)	1.1E-01 (I)	0.1

Table 6
Revised Reference Doses

No.	COC	SCOU BHHRA RfD{Oral (O) and Inhalation (I)}	Revised RfD {Oral (O) and Inhalation (I)}	Ratio of SCOU RfD and Revised RfD
37	1,2,4-Trichlorobenzene	1.0E-02 (I)	5.7E-02 (I)	0.2
38	1,1,1-Trichloroethane		2.0E-02 (O) 2.0E-01 (I)	New New
39	1,2,4-Trimethylbenzene		5.0E-02 (O) 1.7E-03 (I)	New New
40	1,3,5-Trimethylbenzene		5.0E-02 (O) 1.7E-03 (I)	New New
41	Vinyl chloride		3.0E-03 (O) 2.9E-02 (I)	New New
42	Xylenes	2.0E+00 (I)	2.0E-01 (I)	10

Notes

Shaded COCs will result in increased non-cancer hazard.
RfD- Reference Dose

Table 7
Summary of Updated Estimated Blood-Lead Concentrations (µg/dL)
(based on Cal-EPA Lead Spread, Version 7)

	Exposure Point Concentration (mg/kg)		Child Residential							
			SCOU				Updated			
Site Name	Surface	Subsurface	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake
Building 871	12.2	3.8	4.5	4.6	4.4	4.6	2.1	2.0	1.8	1.9
Building 1253	--	--	--	--	--	--	--	--	--	--
Building 1260	--	--	--	--	--	--	--	--	--	--
Building 1344	212.0	3.7	7.8	6.1	4.4	4.6	9.7	6.3	1.8	1.9
Castle Vista Landfill B	122.0	--	6.3	5.4	--	--	6.3	4.4	--	--
Detonation and Burn Facility	--	--		--		--		--	--	--
Discharge Area 3	887	176	18.9		7.2		35.2	**20.6**	8.3	5.5
Discharge Area 5	106.0	8.8	6.1	5.3	4.5	4.6	5.7	4.0	2.0	2.0
Earth Technology Corporation Site #10	283,000.0	--	4663.7	2074.7	--	--	10,701.0	6010.9	--	--
Earth Technology Corporation Site #11	--	--	--	--	--	--	--	--	--	--
Fire Training Area 1	51.6	77.3	5.2	4.9	5.6	5.1	3.6	2.9	4.6	3.4
Fire Training Area 2	--	--	--	--	--	--	--	--	--	--
Fire Training Area 3	--	--	--	--	--	--	--	--	--	--
Fuel Spill 1	--	17.6	--	--	4.6	4.7	--	--	2.3	2.2
Fuel Spill 2	--	--	--	--	--	--	--	--	--	--
Fuel Spill 3	--	11.6	--	--	4.5	4.6	--	--	2.1	2.0
Landfill 1 Area 1	72.9	467.0	5.5	5.1	12.0	8.0	4.4	3.3	**19.3**	**11.7**
Landfill 1 Area 2	16.3	--	4.6	4.7	--	--	2.3	2.1	--	--
Landfill 1 Area 3	6.3	--	4.4	4.6	--	--	1.9	1.9	--	--
Landfill 2 Area 1	9.0	--	4.5	4.6	--	--	2.0	2.0	--	--
Landfill 2 Area 2	231.0	--	8.1	6.2	--	--	**10.4**	6.7	--	--
Landfill 3 Area 1	29,000	6.9	481.8	216.7	4.4	4.6	1098.1	617.6	1.9	1.9
Landfill 3 Area 2	19.4	--	4.7	4.7	--	--	2.4	2.2	--	--
Landfill 4 Area 1	58.6	--	5.3	5.0	--	--	3.9	3.0	--	--
Landfill 4 Area 2	9.9	--	4.5	4.6	4.4	4.6	2.0	2.0	--	--
Landfill 5 Zone 1	12.0	5.8	4.5	4.6	4.4	4.6	2.1	2.0	1.9	1.9
Landfill 5 Zone 2	36.5	--	4.9	4.8	--	--	3.0	2.6	--	--
Landfill 5, DP-9	35.3	6.3	4.9	4.8	4.4	4.6	3.0	2.5	1.9	1.9
Landfill 5, DP-7	--	5.3	--	--	4.4	4.6	--	--	1.9	1.9
PCB Site 9	--	--	--	--	--	--	--	--	--	--
POL Fuel Farm Area	--	--	--	--	--	--	--	--	--	--

Table 7
Summary of Updated Estimated Blood-Lead Concentrations (µg/dL)
(based on Cal-EPA Lead Spread, Version 7)

	Exposure Point Concentration (mg/kg)		Child Residential							
			SCOU				Updated			
Site Name	Surface	Subsurface	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake
Sanitary Sewer Line 8	--	--	--	--	--	--	--	--	--	--
Stain 41	286.0	4.4	9.0	6.6	4.4	4.6	12.5	7.9	1.8	1.9
Storm Drain System Area 1	53.9	--	22.4	12.6	--	--	3.7	2.9	--	--
Storm Drain System Area 2	40.2	--	5.0	4.8	--	--	3.2	3.0	--	--
Structure T-61	--	16.0	--	--	4.6	4.7	--	--	2.3	2.1
Underground Fuel Leak 3	--	--	--	--	--	--	--	--	--	--
Aircraft Maintenance Site #1	50.1	--		4.9		--		2.8		--
Aircraft Maintenance Site #2	175	--		5.8		--		5.5		--
Aircraft Maintenance Site #3	36.1	--		4.8		--		2.5		--
Aircraft Maintenance Site #4	--	--		--		--		--		--
Aircraft Maintenance Site #5	--	--		--		--		--		--
Aircraft Maintenance Site #6	--	--		--		--		--		--
Building 23	--	--		--		--		--		--
Building 47	--	--		--		--		--		--
Building 51	--	--		--		--		--		--
Building 52	--	--		--		--		--		--
Building 53	--	--		--		--		--		--
Building 54	--	--		--		--		--		--
Building 84	--	--		--		--		--		--
Building 175	--	--		--		--		--		--
Building 325	--	--		--		--		--		--
Building 547	--	--		--		--		--		--
Building 551	--	--		--		--		--		--
Building 1205	--	--		--		--		--		--
Building 1207	--	--		--		--		--		--
Building 1266	--	--		--		--	--	--		--
Building 1319	15.6	--		4.7		--		2.1		--
Building 1324	--	--		--		--		--		--
Building 1325	--	--		--		--		--		--
Building 1335	--	--		--		--		--		--
Building 1350	--	--		--		--		--		--

Table 7
Summary of Updated Estimated Blood-Lead Concentrations (µg/dL)
(based on Cal-EPA Lead Spread, Version 7)

	Exposure Point Concentration (mg/kg)		Child Residential							
			SCOU				Updated			
Site Name	Surface	Subsurface	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake
Building 1404	--	--		--		--		--		--
Building 1405	156	--		5.7		--		5.1		--
Building 1529	--	--		--		--		--		--
Building 1532	--	--		--		--		--		--
Building 1541	--	--		--		--		--		--
Building 1560	--	--		--		--		--		--
Building 1562	85.9	--		5.2		--		3.6		--
Building 1709	--	--		--		--		--		--
Building 1762	--	--		--		--		--		--
Building 1865/1868	--	--		--		--		--		--
Castle Vista Landfill A	--	--		--		--		--		--
Discharge Area 2	639	--		9.2		--		15.4		--
Discharge Area 4	--	--		--		--		--		--
Discharge Area 6	18.4	--		4.7		--		2.2		--
Discharge Area 8	166	--		5.8		--		5.3		--
Disposal Pit 4	--	--		--		--		--		--
Earth Technology Corporation #2	29.2	--		4.8		--		2.4		--
Earth Technology Corporation #12	--	--		--		--		--		--
Firing Range	69.7	--		5.0		--		3.3		--
Fuel Spill 4	--	--		--		--		--		--
Hazardous Waste Storage 4	--	--		--		--		--		--
Industrial Waste Line	--	--		--		--		--		--
JP-4 Fuel Line	--	--		--		--		--		--
Sanitary Sewer Line 1	--	--		--		--		--		--
Sanitary Sewer Line 2	--	--		--		--		--		--
Sanitary Sewer Line 3	--	--		--		--		--		--
Sanitary Sewer Line 4	--	--		--		--		--		--
Sanitary Sewer Line 5	--	--		--		--		--		--
Sanitary Sewer Line 6	--	--		--		--		--		--
Sanitary Sewer Line 7	--	--		--		--		--		--
Sanitary Sewer Line 9	--	--		--		--		--		--

Table 7
Summary of Updated Estimated Blood-Lead Concentrations (µg/dL)
(based on Cal-EPA Lead Spread, Version 7)

	Exposure Point Concentration (mg/kg)		Child Residential							
			SCOU				Updated			
Site Name	Surface	Subsurface	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake	Surface with Plant Uptake	Surface w/o Plant Uptake	Subsurface with Plant Uptake	Subsurface w/o Plant Uptake
Solid Waste Management Unit 4.6	--	--		--		--		--		--
Solid Waste Management Unit 4.16	--	--		--		--		--		--
Solid Waste Management Unit 4.20	26	--		4.7		--		2.3		--
Stain 11	--	--		--		--		--		--
Storage Area B-2	30.9	--		4.8		--		2.4		--
Storage Area B-3	--	--		--		--		--		--
Storage Area B-4	--	--		--		--		--		--
Structure 55	--	--		--		--		--		--
Structure 1201	--	--		--		--		--		--
Structure 1571	--	--		--		--		--		--
Structure T66	--	--		--		--		--		--
Structure T67	--	--		--		--		--		--
Structure T 85	--	--		--		--		--		--
Test Center Cell 1 Group	17.5	--		4.7		--		2.2		--
Underground Fuel Leak 1	--	--		--		--		--		--
Underground Fuel Leak 2	17.6	--		4.7		--		2.2		--
Underground Fuel Leak 4	--	--		--		--		--		--

Note

Bold- Results presented in bold represent sites for which the estimated blood-lead concentration has increased from below to above the decision criteria of 10 µg/dl for the child scenario.

Table 8
Summary of SCOU and Updated Baseline Human Health Risk Assessment Results

SITE	CANCER RISK (Adult Residential)		NONCANCER HAZARD (Adult Residential)		SITE	CANCER RISK (Adult Residential)		NON-CANCER HAZARD (Adult Residential)	
	SCOU	UPDATE	SCOU	UPDATE		SCOU	UPDATE	SCOU	UPDATE
F-1	2.9E-08	2.9E-08	0.0001	0.0001	CVLFB	6.2E-06	6.2E-06	0.1	0.1
B23	1.3E-09	1.2E-09	0.0001	0.0001	CVLFB S	2.1E-06	1.4E-06	0.004	0.013
B47	–	–	0.0001	0.0001	DA-3	N/A	5.1E-05	N/A	0.7
B51	–	–	0.001	0.001	DA-5	2.1E-05	4.1E-05	0.3	1.3
B52	–	–	0.001	0.001	DA-5S	6.4E-06	1.6E-05	0.1	0.2
B53	–	–	0.002	0.002	*ETC-2*	*1.1E-04*	*1.1E-04*	*0.0005*	*0.0012*
B54	3.0E-08	3.0E-08	0.001	0.001	*ETC-8*	*2.2E-04*	*2.2E-04*	*0.02*	*0.07*
B84/BT85S	*4.6E-08*	*4.6E-08*	*0.0002*	*0.0002*	*ETC-8 S*	–	–	*0.03*	*0.08*
B325	4.6E-06	4.5E-08	0.004	0.059	ETC-11S	1.8E-05	1.2E-09	0.002	0.005
B551	8.6E-07	8.5E-07	0.02	0.03	FTA-1	5.2E-05	7.5E-05	0.9	1.1
B1205	–	–	0.0001	0.0001	FTA-1S	1.6E-03	1.6E-03	40	41
B1207	–	–	0.00004	0.00005	*FTA-2*	*1.0E-05*	*1.1E-05*	*0.0009*	*0.0028*
B1266	3.6E-08	3.5E-08	0.0003	0.0003	*FTA-2 S*	*5.0E-06*	*5.1E-06*	*0.0002*	*0.0003*
B1319	–	–	0.00004	0.00005	FTA-3S	–	–	0.04	0.06
B1324	–	–	0.01	0.11	FS-1S	–	–	0.4	0.3
B1325	–	–	0.005	0.05	FS-2S	–	–	0.2	0.6
B1350	–	–	0.0002	0.0002	FS-3S	–	–	3.8	2.4
B1404	–	–	0.0001	0.0001	LF-1 A1	6.8E-06	4.0E-05	0.7	0.9
B1532	1.2E-07	1.1E-07	0.01	0.01	LF-1 A1S	3.1E-07	2.5E-05	4.2	5.2
B1541	–	–	0.05	0.6	LF-1 A2	8.8E-07	1.8E-05	0.1	0.2
B1562	5.6E-08	1.8E-06	0.04	0.08	LF-1 A2S	9.0E-08	8.1E-06	1.9	2.1
B1865/8	–	–	0.003	0.01	LF-1 A3	1.8E-06	1.1E-05	0.4	0.6
CVLFA	9.0E-08	8.2E-08	0.002	0.002	LF-2 A1	9.3E-06	7.6E-06	0.1	0.1
DA-2	1.8E-08	5.5E-06	0.3	0.4	LF-2 A1S	–	–	0.01	0.01
DA-4	–	–	0.003	0.003	LF-2 A2	5.1E-05	1.0E-04	0.4	0.7
DA-8	4.0E-07	3.8E-07	0.02	0.02					
HWS-4	–	–	0.0001	0.0001	LF-3 A1	2.1E-03	2.1E-03	10.6	10.9
FS-4	1.7E-08	1.7E-08	0.0002	0.0003	LF-3 A1S	1.7E-04	1.6E-04	0.01	0.02
JP-4	–	–	0.004	0.012	LF-3 A2	1.0E-04	1.0E-04	0.1	0.1
SS-1	3.1E-08	3.0E-08	0.0003	0.0003	LF-4 A1	6.1E-06	6.1E-06	0.001	0.003
SS-2	–	–	0.001	0.003	LF-4 A2	–	–	0.0003	0.0016
SS-3	1.9E-08	1.9E-08	0.0003	0.0003	LF-5 A1	1.1E-05	1.2E-05	0.1	0.2
SS-4	–	–	0.0001	0.0003	LF-5 A1S	1.6E-05	1.5E-07	0.01	0.02
SS-6	–	–	0.002	0.002	LF-5 A2	1.3E-05	2.1E-05	0.3	0.3
SS-9	–	–	0.0001	0.0001	LF-5 A2S	8.0E-06	5.3E-06	0.07	0.11
SWMU 4.20	–	–	0.00002	0.00002	DP-7 S	1.1E-05	7.5E-06	0.05	0.09
SAB-4	6.7E-08	7.5E-08	0.1	0.1	DP-9	8.6E-06	8.1E-06	0.1	0.2
St55	3.1E-07	3.0E-07	0.02	0.02	DP-9 S	1.0E-05	1.6E-05	0.1	0.2
StT66	–	–	0.002	0.002	PCB-9	1.1E-04	7.7E-05	1.8	1.5
StT85	–	–	0.00001	0.00001	PCB-9 S	8.7E-06	7.8E-06	0.2	0.2
St1201	1.6E-09	1.4E-09	–	–	PFFA S	1.3E-05	1.3E-05	0.02	0.03
TCC1	2.8E-07	2.6E-07	0.02	0.28	*SAB-1*	*3.7E-06*	*3.2E-07*	*0.05*	*0.08*
UFL-1	8.3E-08	4.6E-07	0.001	0.02	*SAB-1 S*	*6.5E-06*	*4.4E-10*	*0.1*	*0.2*
UFL-2	4.6E-07	8.2E-08	0.01	0.02	SS-8 S	6.5E-06	6.6E-06	0.002	0.002
B871	7.7E-06	6.9E-06	0.1	0.1	Stain 41	2.5E-04	2.5E-04	0.01	0.02
B871S	1.2E-07	1.2E-07	0.0001	0.001	SDS A1	3.8E-05	1.2E-03	7.3	14.4
B1253S	7.1E-05	7.1E-05	0.0003	0.004	SDS A2	1.4E-07	6.8E-05	0.6	1.0
B1260S	8.1E-05	6.7E-05	0.2	1.0	St T61 S	9.6E-04	9.8E-04	0.01	0.4
B1344	*1.4E-04*	*1.8E-04*	*0.2*	*0.4*	UFL-3 S	–	–	0.2	0.1
B1344S	*2.1E-05*	*2.1E-05*	*0.0005*	*0.0009*					

Table 8
Summary of SCOU and Updated Baseline Human Health Risk Assessment Results

Notes

All values are for the adult residential scenario, surface soil, unless designated with the letter "S" after the site name, indicating subsurface soil. Bold- Results presented in bold represent sites for which the cancer risk or non-cancer hazard has increased from below to above the decision criteria of 1.0E-06 and 1.0, respectively. Italics- SCOU site for which data gap results modified the SCOU BHHRA results. The updated data gap risk assessment values are entered under the SCOU and were also used as the basis for the updated results.

-- *Indicates no COPCs were affected by update.*

N/A not applicable

Table 9
B1562 Updated Screening Risk Assessment with Homegrown Produce Pathway

Building 1562: Adult Residential											
					Carcinogenic Risk						
Analyte	Conc. (mg/kg)	SF_o (mg/kg-day)$^{-1}$	SF_i (mg/kg-day)$^{-1}$	Class	Ingestion	Inhalation	Dermal	Produce	Total	%	w/o Produce
Inorganics											
Cadmium	3.0	3.8E-01	1.5E+01	B1	6.7E-07	5.9E-09	2.2E-09	5.2E-05	5.2E-05	**1.0E+02**	6.8E-07
Lead	85.9			B2						**0**	
Organics											
Bis(2-ethylhexyl)phthalate	0.98	1.4E-02	1.4E-02	B2	8.1E-09	1.8E-12	2.7E-09	1.2E-07	1.3E-07	**2.4E-01**	1.1E-08
Methylene chloride	0.0075	1.4E-02	3.5E-03	B2	6.2E-11	1.7E-08	2.0E-11	1.1E-07	1.3E-07	**2.4E-01**	1.7E-08
					6.8E-07	**2.3E-08**	**4.9E-09**	**5.2E-05**	**5.3E-05**		**7.1E-07**
					1	0.04	0	99			
					Noncarcinogenic Hazard						
Analyte	Conc. (mg/kg)	RfD_o (mg/kg-day)	RfD_i (mg/kg-day)		Ingestion	Inhalation	Dermal	Produce	Total	%	
Inorganics											
Cadmium	3.0	0.00	5.7E-06		8.2E-03		2.7E-05	6.4E-01	6.4E-01	**1.0E+02**	8.2E-03
Lead	85.9	0.00	0.0E+00							**0**	
Organics											
Bis(2-ethylhexyl)phthalate	0.98	2.0E-02	2.0E-02		6.7E-05	1.5E-08	2.2E-05	9.6E-04	1.1E-03	**1.6E-01**	8.9E-05
Methylene chloride	0.0075	6.0E-02	8.6E-01		1.7E-07	1.3E-05	5.7E-08	3.0E-04	3.2E-04	**4.9E-02**	1.4E-05
					0.008	**0.0000**	**0.00005**	**0.6**	**0.6**		**0.008**
					1	0	0	99			

Notes
1. Calculation of average daily dose (ADD) and lifetime average daily dose (LADD) were performed in accordance with the methodology presented in Section 5.5, Estimation of Chemical Intake, of the SCOU BHHRA (Jacobs, 1997).
2. *Calculation of carcinogenic risk and non-carcinogenic hazard were performed in accordance with the methodology described in Section* 7.1, *Risk Characterization Methodology, of the SCOU* BHHRA (Jacobs, 1997).

Table 10
DA-2 Updated Screening Risk Assessment with Homegrown Produce Pathway

Discharge Area 2: Adult Residential											
					Carcinogenic Risk						
Analyte	Conc. (mg/kg)	SF_o (mg/kg-day)$^{-1}$	SF_i (mg/kg-day)$^{-1}$	Class	Ingestion	Inhalation	Dermal	Produce	Total	%	w/o Produce
Inorganics											
Cadmium	9.1	3.8E-01	1.5E+01	B1	2.0E-06	1.8E-08	6.7E-09	1.6E-04	1.6E-04	100	2.1E-06
Lead	639.0			B2						0	
Organics											
Methylene chloride	0.0045	1.4E-02	3.5E-03	B2	3.7E-11	1.0E-08	1.2E-11	6.6E-08	7.6E-08	0	1.0E-08
					2.0E-06	**2.8E-08**	**6.7E-09**	**1.6E-04**	**1.6E-04**		**2.1E-06**
					1	0.02	0	99			
					Noncarcinogenic Hazard						
Analyte	Conc. (mg/kg)	RfD_o (mg/kg-day)	RfD_i (mg/kg-day)		Ingestion	Inhalation	Dermal	Produce	Total	%	
Inorganics											
Barium	670	7.00E-02	1.4E-04		1.3E-02	1.4E-03	4.3E-04	5.4E-02	6.9E-02	3	1.5E-02
Boron	22.5	9.00E-02	5.7E-03		3.4E-04	1.2E-06	1.1E-05	1.4E-03	1.8E-03	0	3.6E-04
Cadmium	9.1	5.00E-04	5.7E-06		2.5E-02		8.3E-05	1.9E+00	2.0E+00	95	2.5E-02
Chromium	150	1.50E+00			1.4E-04		4.5E-06	5.7E-04	7.1E-04	0	1.4E-04
Lead	639	0.00E+00	0.0E+00							0	
Molybdenum	8.3	5.00E-03	0.0E+00		2.3E-03		7.5E-05	9.4E-03	1.2E-02	1	2.3E-03
Selenium	1.2	5.00E-03			3.3E-04		1.1E-05	1.4E-03	1.7E-03	0	3.4E-04
Organics											
sec-Butylbenzene	0.18	1.0E-02	1.0E-02		2.5E-05	5.5E-09	8.2E-06	1.0E-04	1.4E-04	0	3.3E-05
Ethylbenzene	0.22	1.0E-01	2.9E-01		3.0E-06	2.5E-05	1.0E-06	4.3E-04	4.6E-04	0	2.9E-05
Isopropylbenzene	0.15	1.0E-01	1.1E-01		2.1E-06	4.2E-10	6.8E-07	1.5E-04	1.6E-04	0	2.7E-06
Isopropyltoluene	0.34	1.0E-01	1.1E-01		4.7E-06	9.4E-10	1.5E-06	2.0E-04	2.1E-04	0	6.2E-06
Methylene chloride	0.0045	6.0E-02	8.6E-01		1.0E-07	8.1E-06	3.4E-08	1.8E-04	1.9E-04	0	8.2E-06
Naphthalene	0.62	2.0E-02	8.6E-04		4.2E-05	4.4E-03	1.4E-05	5.0E-03	9.5E-03	0	4.4E-03
n-Propylbenzene	0.30	0.0E+00	0.0E+00							0	
Toluene	0.09	2.0E-01	1.1E-01		6.2E-07	4.0E-05	2.0E-07	1.5E-04	1.9E-04	0	4.1E-05
1,2,3-Trichlorobenzene	0.0009	0.0E+00	0.0E+00							0	
1,2,4-Trimethylbenzene	2.7	5.0E-02	1.7E-03		7.4E-05	4.8E-07	2.5E-05	3.1E-04	4.1E-04	0	9.9E-05
1,3,5-Trimethylbenzene	4.2	5.0E-02	1.7E-03		1.2E-04	7.5E-07	3.8E-05	4.8E-04	6.3E-04	0	1.5E-04
Xylenes	2.70	2.0E+00	2.0E-01		1.8E-06	5.7E-04	6.1E-07	2.5E-04	8.2E-04	0	5.7E-04
					0.04	**0.0064**	**0.0007**	**2.0**	**2.1**		**0.05**
					2	0	0	98			

Notes
1. Calculation of average daily dose (ADD) and lifetime average daily dose (LADD) were performed in accordance with the methodology presented in Section 5.5, Estimation of Chemical Intake, of the SCOU BHHRA (Jacobs, 1997).
2. Calculation of carcinogenic risk and non-carcinogenic hazard were performed in accordance with the methodology described in Section 7.1, Risk Characterization Methodology, of the SCOU BHHRA (Jacobs, 1997).

Table 11
SDS Area 1 Updated Quantitative Risk Assessment (without SDSE09)

Storm Drain System Area 1 Surface Soil: Adult Residential										
					Carcinogenic Risk					
Analyte	Conc. (mg/kg)	SF_o (mg/kg-day)$^{-1}$	SF_i (mg/kg-day)$^{-1}$	Class	Ingestion	Inhalation	Dermal	Produce	Total	%
Inorganics										
Cadmium	2.3	3.8E-01	1.5E+01	B1	5.1E-07	4.5E-09	1.7E-09	4.0E-05	4.0E-05	51
Lead	53.9			B2						0
Organics										
Benzo(a)anthracene	0.62	1.2E+00	7.3E-01	B2	4.4E-07	5.9E-11	2.2E-07	4.0E-06	4.6E-06	6
Benzo(a)pyrene	0.46	1.2E+01	7.3E+00	B2	3.2E-06	4.4E-10	1.6E-06	2.2E-05	2.7E-05	35
Benzo(b)fluoranthene	0.95	1.2E+00	7.3E-01	B2	6.7E-07	9.1E-11	3.3E-07	4.5E-06	5.6E-06	7
Bis(2-ethylhexyl)phthalate	3.2	1.4E-02	1.4E-02	B2	2.6E-08	5.9E-12	8.7E-09	3.8E-07	4.1E-07	1
Chrysene	0.84	1.2E-01	3.9E-02	B2	5.9E-08	4.3E-12	2.9E-08	5.4E-07	6.2E-07	1
					4.9E-06	**5.1E-09**	**2.2E-06**	**7.1E-05**	**7.9E-05**	
					6	0.0	3	91		
					Noncarcinogenic Hazard					
Analyte	Conc. (mg/kg)	RfD_o (mg/kg-day)	RfD_i (mg/kg-day)		Ingestion	Inhalation	Dermal	Produce	Total	%
Inorganics										
Cadmium	2.3	5.0E-04	0.0E+00		6.3E-03		2.1E-05	4.9E-01	4.9E-01	64
Chromium	129.7	1.5E+00			1.2E-04		3.9E-06	4.9E-04	6.1E-04	0
Cobalt	5.5	6.0E-02	0.0E+00		1.3E-04		4.2E-06	5.2E-04	6.5E-04	0
Lead	1100.0	0.0E+00	0.0E+00							0
Molybdenum	167.0	5.0E-03	0.0E+00		4.6E-02		1.5E-03	1.9E-01	2.4E-01	31
Selenium	2.5	5.0E-03			6.7E-04		2.2E-05	2.8E-03	3.5E-03	0
Silver	0.31	5.0E-03			8.4E-05		2.8E-06	3.5E-04	4.3E-04	0
Organics										
Acenaphthene	0.050	6.0E-02	6.0E-02		1.1E-06	7.8E-07	5.7E-07	5.6E-05	5.8E-05	0
Anthracene	0.22	3.0E-01	3.0E-01		1.0E-06	3.8E-07	5.0E-07	2.9E-05	3.1E-05	0
Benzo(a)anthracene	0.62	0.0E+00								0
Benzo(a)pyrene	0.46	0.0E+00								0
Benzo(b)fluoranthene	0.95	0.0E+00								0
Benzo(g,h,i)perylene	0.085	0.0E+00								0
Bis(2-ethylhexyl)phthalate	3.2	2.0E-02	2.0E-02		2.2E-04	4.9E-08	7.3E-05	3.1E-03	3.4E-03	0
Butyl benzyl phthalate	0.43	2.0E-01	2.0E-01		2.9E-06	6.6E-10	9.8E-07	6.0E-05	6.3E-05	0
Chrysene	0.84	3.0E-02	3.0E-02		3.8E-05	8.5E-09	1.9E-05	3.5E-04	4.0E-04	0
Di-*n*-octylphthalate	0.15	2.0E-02	2.0E-02		1.0E-05	2.3E-09	3.4E-06	4.3E-05	5.7E-05	0
Fluoranthene	1.3	4.0E-02	4.0E-02		4.5E-05	9.9E-09	2.2E-05	7.5E-04	8.1E-04	0
Fluorene	0.16	4.0E-02	4.0E-02		5.5E-06	2.5E-06	2.7E-06	2.1E-04	2.2E-04	0

Table 11
SDS Area 1 Updated Quantitative Risk Assessment (without SDSE09)

Storm Drain System Area 1 Surface Soil: Adult Residential										
4-Methylphenol	0.12	5.0E-03	5.0E-03		3.3E-05	7.3E-09	1.1E-05	2.3E-02	2.3E-02	3
Phenanthrene	1.5	3.0E-02	3.0E-02		6.8E-05	1.5E-08	3.4E-05	1.7E-03	1.8E-03	0
Pyrene	1.7	3.0E-02	3.0E-02		7.8E-05	1.7E-08	3.9E-05	1.4E-03	1.5E-03	0
					0.1	**3.8E-06**	**0.002**	**0.7**	**0.8**	
					7	0.0005	0.23	93		

Notes
1. Calculation of average daily dose (ADD) and lifetime average daily dose (LADD) were performed in accordance with the methodology presented in Section 5.5, Estimation of Chemical Intake, of the SCOU BHHRA (Jacobs, 1997).
2. Calculation of carcinogenic risk and non-carcinogenic hazard were performed in accordance with the methodology described in Section 7.1, Risk Characterization Methodology, of the SCOU BHHRA (Jacobs, 1997).

Table 12
Updated Remedial Action Objectives for Volatile Organics

Contaminant	Model	Water Quality Site Assessment Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas])						BHHRA RAOs (Residential Scenario, previous 1996 RAOs in parentheses, where applicable)	BHHRA RAOs (Industrial Scenario, previous 1996 RAOs in parentheses, where applicable)
		Shallow		Deep					
		0-10'	10-20'	20-30'	30-40'	40-50'	50-60'	< 15 feet (µg/kg)	< 15 feet (µg/kg)
Volatile Organics[1]									
benzene (soil)	VLEACH1	88,567.0	19,594.0	5,658.0	1,698.9	501.1	86.2	360	610
	VLEACH2	291.5	68.4	20.8	3.0	1.4	0.0		
benzene (soil gas)	VLEACH1	85,763.0	18,974.0	5,479.0	1,645.2	485.2	83.5		
	VLEACH2	282.2	66.3	20.1	5.9	1.4	0.1		
carbon tetrachloride (soil)	VLEACH1	2,700.0	1,000.0	500.0	300.0	200.0	100.0	240 (650)	400 (1100)
	VLEACH2	47.8	18.3	10.2	6.6	4.6	1.7		
carbon tetrachloride (soil gas)	VLEACH1	2,846.8	1,040.1	559.1	352.7	235.0	102.4		
	VLEACH2	49.6	19.0	10.6	6.9	4.8	1.8		
chloroform (soil)	VLEACH1	8,900.0	2,000.0	5,700.0	1,700.0	500.0	100.0	450 (460)	760 (770)
	VLEACH2	291.5	68.4	20.8	3.0	1.4	0.0		
chloroform (soil gas)	VLEACH1	85,763.0	18,974.0	5,479.0	1,645.2	485.2	83.5		
	VLEACH2	282.2	66.3	20.1	5.9	1.4	0.1		
dichlorobenzene, 1,2-(soil)	VLEACH1	293,400.0	102,200.0	28,500.0	8,600.0	2,500.0	500.0	370,000 (700,000)	370,000 (700,000)
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2		
dichlorobenzene, 1,2-(soil gas)	VLEACH1	56,439.0	19,962.0	5,479.3	1,646.1	490.2	93.5		
	VLEACH2	56,439.0	37,525.0	10,512.0	2,962.3	547.8	4.8		
dichlorobenzene,1,4-(soil)	VLEACH1	293,400.0	102,200.0	28,500.0	8,600.0	2,500.0	500.0	3,600 (3500)	6,100 (5800)
	VLEACH2	293,350.0	195,050.0	54,641.0	15,397.0	2,847.5	25.2		
dichlorobenzene,1,4-(soil gas)	VLEACH1	56,439.0	19,962.0	5,479.3	1,646.1	490.2	93.5		
	VLEACH2	56,439.0	37,525.0	10,512.0	2,962.3	547.8	4.8		
dichlorodiflouoromethane (FC12)- (soil)	VLEACH1	85.0	25.0	12.0	6.0	3.0	1.0	280,000 (N/A)	400,000 (N/A)
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1		
dichlorodiflouoromethane (FC12)- (soil gas)	VLEACH1	21,035.0	6,187.5	2,850.5	1,548.9	845.8	312.7		
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2		

Table 12
Updated Remedial Action Objectives for Volatile Organics

Contaminant	Model	Water Quality Site Assessment Threshold for Given Maximum Depths of Contamination (µg/kg [soil], µg/L [soil gas]) Shallow 0-10'	Shallow 10-20'	Deep 20-30'	Deep 30-40'	Deep 40-50'	Deep 50-60'	BHHRA RAOs (Residential Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)	BHHRA RAOs (Industrial Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)
dichloroethane,1,2- (soil)	VLEACH1	84.9	25.0	11.5	6.3	3.4	1.3	430	720
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1		
dichloroethane,1,2- (soil gas)	VLEACH1	21,035.0	6,187.5	2,850.5	1,548.9	845.8	312.7		
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2		
dichloroethene, cis-,1,2- (soil)	VLEACH1	1,212.7	454.7	249.5	160.7	110.0	50.8	140,000	190,000
	VLEACH2	21.5	8.4	4.8	3.2	2.3	1.0		
dichloroethene, cis-,1,2- (soil gas)	VLEACH1	2,294.0	860.1	472.0	304.0	208.1	96.0		
	VLEACH2	40.7	16.0	9.1	6.1	4.4	1.8		
dichloropropane,1,2- (soil)	VLEACH1	——	——	——	——	——	——	670 (N/A)	1,100 (N/A)
	VLEACH2	——	——	——	——	——	——		
dichloropropane,1,2- (soil gas)	VLEACH1	——	——	——	——	——	——		
	VLEACH2	——	——	——	——	——	——		
ethylbenzene (soil)	VLEACH1	220,400.0	88,804.0	24,747.0	7,435.9	2,226.0	442.4	230,000	230,000
	VLEACH2	220,340.0	220,340.0	78,540.0	22,619.0	4,383.4	42.1		
ethylbenzene (soil gas)	VLEACH1	48,799.0	19,662.0	5,479.3	1,646.3	492.1	97.9		
	VLEACH2	48,785.0	48,785.0	17,391.0	5,008.2	970.6	9.3		
methylene chloride (soil)	VLEACH1	84.9	25.0	11.5	6.3	3.4	1.3	2,300	3,900
	VLEACH2	8.5	2.5	1.2	0.6	0.3	0.1		
methylene chloride (soil gas)	VLEACH1	21,035.0	6,187.5	2,850.5	1,548.9	845.8	312.7		
	VLEACH2	2,001.3	620.6	286.5	156.8	85.4	14.2		
naphthalene (soil)	VLEACH1	82,907.0	82,907.0	82,907.0	82,907.0	21,969.0	1,707.6	190,000 (240000)	260,000 (8500000)
	VLEACH2	82,896.0	82,896.0	82,896.0	82,896.0	68,348.0	74.9		
naphthalene (soil gas)	VLEACH1	1,599.9	1,599.9	1,599.9	1,599.9	424.0	33.0		
	VLEACH2	1,599.9	1,599.9	1,599.9	1,599.9	1,318.9	1.4		
tetrachloroethene (soil)	VLEACH1	2,700.0	1,000.0	500.0	300.0	200.0	100.0	3,800	6,300
	VLEACH2	47.8	18.3	10.2	6.6	4.6	1.7		

Table 14
Updated Remedial Action Objectives for Metals/Other Inorganics

Contaminant	Water Quality Site Assessment Threshold for Metals[3] (µg/kg)	BHHRA RAOs (Residential Scenario, previous 1996 RAOs in parentheses, where applicable) (µg/kg)	BHHRA RAOs (Industrial Scenario, previous 1996 RAOs in parentheses, where applicable) (µg/kg)
Metals/Other Inorganics			
aluminum	71103000.00	100,000,000 (N/A)	100,000,000 (N/A)
antimony	11,500	280,000	680,000
arsenic[4]	20,000	1,000	2,400
barium	2775000.00	44,000,000 (48000000)	100000000
beryllium	7600.00	910,000 (380)	1,500,000 (1000)
cadmium	43700.00	4,400 (730000)	15,000 (2000000)
chromium[3]	2,500,000	100,000,000	100,000,000
cobalt	349,000	42,000,000	100,000,000
copper	244000.00	26,000,000 (N/A)	63,000,000 (N/A
lead	855000	400000	750,000 (1000000)
manganese	228000.00	12,000,000 (N/A)	25,000,000 (N/A)
molybdenum	95,000	3,500,000	8,500,000
mercury	100	210,000	510,000
nickel[1]	1167000.00	8,400,000 (14000000)	14,000,000 (34000000)
selenium	32,000	3,500,000	8,500,000
silver	N/A	3,500,000	8,500,000
thallium[2]	20000.00	47,000 (57000)	110,000 (140000)
vanadium	629000.00	4,900,000 (N/A)	12,000,000 (N/A
zinc	319000.00	100,000,000 (N/A)	100,000,000 (N/A)

Notes

[1]Nickel (Soluble Salts)

[2]Thallic Oxide

[3]WQSA values derived using California Water Board Designated Level Methodology; depth interval assumed—40 to 65 ft bgs.

[4]The arsenic RAO is less than the TBV so the TBV would take precedence as the RAO.

Contaminant	SCOU Shallow Silts Threshold Background Value (µg/kg)
Metals/Other Inorganics	
aluminum	16,200,000
antimony	6,700
arsenic	9,900
barium	319,000
beryllium	890
cadmium	500
chromium[3]	29,400
cobalt	12,800
copper	53,600
lead	7,400
manganese	1,100,000
molybdenum	590
mercury	100
nickel[1]	29,600
selenium	500
silver	300
thallium[2]	40,000
vanadium	70,200
zinc	70,200

3
es for Semivolatile Organics

hreshold for Given tion ([µg/kg [soil]) Deep '	40-50'	50-60'	BHHRA RAOs (Residential Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)	BHHRA RAOs (Industrial Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)
			100,000,000 (5700)	100,000,000 (5700)
7.0	21,969.0	1,707.6	890 (950)	1,200
7.0	21,969.0	1,707.6	89 (95)	120
7.0	21,969.0	1,707.6	890 (950)	1,200
7.0	21,969.0	1,707.6	890 (950)	1,200
7.0	21,969.0	1,707.6	87000 (91,000)	140,000
7.0	21,969.0	1,707.6	8,900 (7200)	12,000
7.0	21,969.0	1,707.6	52000000 (55,000,000)	68,000,000
7.0	21,969.0	1,707.6	5900 (6,100)	12,000
7.0	21,969.0	1,707.6	4200 (4300)	8,400
7.0	21,969.0	1,707.6	4200 (4300)	8,400
7.0	21,969.0	1,707.6	150 (160)	200
7.0	21,969.0	1,707.6	3900 n(4,100)	6,200
7.0	21,969.0	1,707.6	18000000 (20,000,000)	20,000,000
7.0	21,969.0	1,707.6	1,100	2,200
7.0	21,969.0	1,707.6	N/A	N/A
7.0	21,969.0	1,707.6	160	310
7.0	21,969.0	1,707.6	N/A	N/A
7.0	21,969.0	1,707.6	N/A	N/A
7.0	21,969.0	1,707.6	N/A	N/A
7.0	21,969.0	1,707.6	890 (950)	2,900 (2600)
7.0	21,969.0	1,707.6	2600000 (2,700,000)	3,400,000 (34000000)
7.0	21,969.0	1,707.6	190,000 (240000)	260,000 (8500000)
7.0	21,969.0	1,707.6	10	24
7.0	21,969.0	1,707.6	210 (570)	290 (720)
7.0	21,969.0	1,707.6	1,200 (N/A)	2,000 (N/A)
7.0	21,969.0	1,707.6	14,000,000 (N/A)	15,000,000 (N/A)
7.0	21,969.0	1,707.6	14,000,000 (100,000)	54,000,000 (100000)
7.0	21,969.0	1,707.6	0.01 (N/A)	0.024 (N/A)
7.0	21,969.0	1,707.6	N/A	N/A

Table 12
ı Objectives for Volatile Organics

ssessment Threshold for Given ımination (µg/kg [soil], µg/L [soil gas]) Deep 30'	30-40'	40-50'	50-60'	BHHRA RAOs (Residential Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)	BHHRA RAOs (Industrial Scenario, previous 1996 RAOs in parentheses, where applicable) < 15 feet (µg/kg)
559.1	352.7	235.0	102.4		
10.6	6.9	4.8	1.8		
,463.0	3,744.0	1,128.0	207.6	520,000 (3400000)	4,700,000
,600.0	6,148.9	1,201.8	25.7		
,479.0	1,645.9	489.2	91.3		
,495.3	2,703.0	528.3	11.3		
	TBD[2]	TBD[2]	TBD[2]	N/A	N/A
—	—	—	—		
	TBD[2]	TBD[2]	TBD[2]	N/A	N/A
—	—	—	—		
538.7	339.8	226.5	98.7	3,700	6,100
10.2	6.6	4.6	1.7		
559.1	352.7	235.0	102.4		
10.6	6.9	4.8	1.8		
12.0	6.0	3.0	1.0	1,200,000	1,700,000
1.2	0.6	0.3	0.1		
,850.5	1,548.9	845.8	312.7		
286.5	156.8	85.4	14.2		
,480.0	8,555.9	2,547.9	485.9	120,000 (N/A)	170,000 (N/A)
,641.0	15,397.0	2,847.5	25.2		
,479.3	1,646.1	490.2	93.5		
,512.0	2,962.3	547.8	4.8		
11.5	6.3	3.4	1.3	30 (N/A)	51 (N/A)
1.2	0.6	0.3	0.1		
,850.5	1,548.9	845.8	312.7		
286.5	156.8	85.4	14.2		

APPENDIX D

SVE START AND STOP CRITERIA

SVE TURN-ON CRITERIA
SVE Turn-On Criteria
Castle AFB

Introduction

There are a number of factors that can influence the decision to install and operate SVE at a site where contaminant levels exceed human health or water quality screening threshold criteria. For these sites the issue becomes: is it technically and economically feasible to install and operate an SVE system to remediate the site?

The SCOU FS selected SVE as the preferred remedial technology for these sites. However the SCOU RI/FS used a conservative screening analysis for the remedy selection which did not fully evaluate the practicality of SVE implementation on a site by site basis. The criteria below were developed to determine the technical and economical feasibility of SVE. The criteria below will be used to determine whether SVE should be implemented. This evaluation will be called a "START" and will be a primary document under the FFA.

This analysis applies to sites at Castle AFB that overlie contaminated groundwater which are addressed in the final Comprehensive Basewide Part 1 Record of Decision, signed in 1997.

The START should be conducted after all the parties agree that:

- The site has been adequately characterized;
- The risk assessment indicates that site contaminants pose a potential threat to either human health and/or the environment, including water quality.
- The SCOU FS indicated that SVE is the remedy most suited to remediate the site.

The decision to install and operate an SVE system will depend upon the analysis of the three criteria listed below. It is always technically possible to remove mass, but installing and operating an SVE system requires evaluating the tradeoff between certain monetary expenditure and uncertain environmental benefit. If the contaminant mass in the vadose zone will not reach the groundwater, remediation will not be warranted. If the contaminant concentration in the leachate entering the aquifer from the vadose zone is below the aquifer cleanup level (MCLs), the aquifer will not be unacceptably degraded further, and remediation will not be warranted. Even if the leachate concentration is

above the aquifer cleanup levels (MCLs), remediation may or may not be warranted. Several lines of evidence must be used to make this professional judgment since measuring actual leachate concentrations may be technically impractical and predicting leachate concentrations via modeling might be inaccurate.
This process represents a compromise of the various parties' policies and the results of the evaluation should be used to prepare the SCOU Part 2 Record of Decision.

Decision Criteria

The decision to install and operate SVE will be based on scientific, economic, and engineering judgment using the following criteria in sequence. The Air Force and the regulatory agencies acknowledge that there is uncertainty inherent in all of the elements used in the START, and that consensus is necessary to determine the levels of uncertainty that are acceptable in each of the elements.

I. Will the contaminant mass in the vadose zone reach the groundwater, based on either a screening level or site-specific evaluation?

To answer this question, START elements "a" through "g" must be addressed.

- If the answer is "no", then proceed with site closure.
- If the answer is "yes" or "unknown", then proceed to criterion II.

II. Will the contaminant mass in the vadose zone cause the contaminant concentrations in the leachate to exceed the aquifer cleanup level?

To answer this question, START elements "a" through "h" must be addressed.

- If the answer is "no", then proceed with site closure.
- If the answer is "yes", or "unknown", then proceed to criterion III which requires a complete START.

III. Based on an evaluation of all of the elements, is it appropriate to install and operate an SVE system at the site?

To answer this question, all START elements must be addressed.

- If the answer is "yes", then proceed with SVE system installation and operation.
- If the answer is "no" proceed with site closure negotiations.

Elements of the START

The following elements should be applied to evaluate the criteria listed above.

a. Are there any time- or land use-critical re-use issues with the site, and if so, what are they? These types of issues may preclude the need for further analysis, if SVE is required to address these concerns.

b. What is the estimated contaminant mass and areal and vertical extent of the vadose zone contaminant plume? Include contaminant isoconcentration maps and plume cross-sections to illustrate the contaminant concentrations and distribution in the subsurface.

c. Do the data indicate contaminant migration towards the groundwater? Qualitative answers to this question may be either "yes", "no" or "unable to make a determination". Evidence for migration towards groundwater may include such lines of evidence as: 1) increasing contaminant concentrations in onsite monitoring wells; 2) soil gas profiles from nested wells to estimate the contaminant's propensity for migration; and 3) time-series profiles of soil gas concentrations in nested wells.

d. What is the lithology of areas that demonstrate significant soil gas concentrations of contaminants? Use site-specific information, and include as much information as possible, such as porosity, moisture content and carbon content of soil, etc.

e. What are the actual site specific infiltration and percolation rates? If site specific data are not available, what are the predicted rates?

f. Are there sufficient historical groundwater monitoring data for wells at or adjacent to the site to determine whether the vadose zone plume has or has not impacted the groundwater? (This determination may not be possible due to active groundwater extraction in the area.)

g. Is there any other site specific factors that should be considered in the evaluation such as site history and physical characteristics (e.g. organic carbon, biodegradation)? Factors to consider for this element include: 1) the nature of the release (for example: one-time spill or continued release over time?; how long ago the release occurred or ceased?; was the release to surface soil, or through a conduit to the subsurface such as a French drain, dry well, or leaking sewer line?, etc.) and 2) any site-specific physical characteristics that may enhance or retard the contaminants subsurface migration (such as unusual presence or absence of low permeability layers, high carbon content of soil, etc.).

h. What is the actual or predicted concentration and mass flux rate of leachate leaving the vadose zone? What is the concentration trend of leachate over time based on field data and modeling?

i. Qualitatively, what is the estimated SVE effectiveness of a system, based on known information and experience from similar sites?

j. How much money, if any has been spent to date on the site's remediation?

k. What is the estimated cost to install an SVE system?

l. What are the locations and capture zones of operating groundwater extraction wells relative to the vadose zone contaminant plume? Will the existing wells effectively capture the contaminants from the site? If not, what are the additional costs to add groundwater wells?

m. What is the cost of vadose zone remediation compared to the incremental cost for additional groundwater remediation due to impacts from the site provided that the underlying contamination has not reached aquifer cleanup levels?

To implement this element, the following costs need to be calculated:

- The cost to reach the aquifer cleanup level *without* the additional impact from the site (GW_0); (SVE has been implemented)
- The cost to reach the aquifer cleanup level *with* the additional impact from the site (GW_1); (SVE has not been implemented)
- The cost of SVE installation and operation (SVE_1).

These costs can be calculated following the steps outlined below:

1. Estimate the predicted time required for the groundwater extraction system to reach aquifer cleanup level(s) in the vicinity of the site *without* additional impact from the site.
2. Estimate the monthly cost to continue operation of the groundwater extraction system in the area impacted by the site?
3. Calculate the cost to reach the aquifer cleanup level (GW_0) in the vicinity of the site *without* the additional impact from the site, because SVE will be installed and operated. (GW_0 = step 1 x step 2).
4. Using the measured residual soil gas concentrations at the site, calculate the mass of the residual contaminant in the vadose zone (same as element "b").

5. Estimate the site's potential impact to groundwater using appropriate vadose zone and groundwater fate and transport models.
6. Estimate the time to reach the groundwater aquifer cleanup level using the modeling results obtained in step 5 above.
7. Estimate the monthly cost to continue operation of the groundwater extraction system in the area impacted by the site?
8. Calculate the cost to reach the aquifer cleanup level *with* the additional impact from the site (GW_1), because SVE will not be installed and operated. (GW_1 = (step 6 x step 7) plus element l).
9. Estimate the monthly cost to operate the SVE system based on historical costs (including all costs relating to operation and shutdown).
10. Estimate the cost to install an SVE system and operate for an agreed-upon length of time that is based on site-specific conditions, such as 6 months. (SVE_1 = length of time x step 9 plus cost to install SVE i.e. element k)
11. Compare the costs of groundwater extraction *without* SVE at the site to the costs of groundwater extraction *with* SVE at the site. Is the cost of groundwater extraction without SVE at the site greater than or less than to the cost of groundwater extraction with SVE at the site? Is this cost savings to the GW system worth the expense of installing and operating an SVE system? Mathematically, this can be expressed as:

$$\text{Is } (GW_1 - GW_0) < \text{ or } > (SVE_1)\ ?$$

Implementation

The Air Force, the USEPA, and the State (DTSC and the RWQCB) will jointly decide, based on the START evaluation, whether the SVE system should or should not be installed at the site. The START should be implemented in a phased approach, with the less complex criteria (criteria I and II described above) being evaluated first. Evaluation of these two criteria may indicate that the SVE system is not necessary, without having to perform a complete START (criterion III).

There are several potential outcomes of the START evaluation. Ideally, the START would indicate unequivocally that either the SVE system would not be necessary, and all parties agree that the site could be closed, or that SVE is warranted at the site and should be installed and operated. Another potential outcome is that the START would indicate that the SVE system is not economically or technically justified, but that the site may not yet be suitable for closure, based on remaining threats to the environment or water quality. In this case, additional discussion between the parties is necessary to determine what course of action is warranted, such as alternate remedial measures or long-term monitoring.

Due to the reliance of the START on professional judgment, another outcome of the STOP is that the parties may not agree on whether the SVE system should be installed or not. If the parties cannot reach a joint resolution, any party may invoke dispute resolution.

US EPA: RPM ____________________
Lisa Hanusiak

AFBCA: RPM ____________________
Todd Lanning

CA DTSC: RPM ____________________
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CVRWQCB: RPM ____________________
John Russell

SVE TURN-OFF CRITERIA

SVE Termination or Optimization Process
Castle AFB

Introduction

The cleanup goal for the sites to be remediated using soil vapor extraction (SVE) is the lowest cleanup level technically and economically achievable to protect human health and the environment, including groundwater quality. The sites to be evaluated at Castle AFB overlie contaminated groundwater which is addressed in the final Comprehensive Base wide Part 1 Record of Decision, signed in 1997. The need to continue operation of an SVE system shall be evaluated at each site or group of sites. This evaluation will be called an SVE Termination or Optimization Process (STOP) and will be considered a primary document under the Federal Facilities Agreement and it may formally document site closure.

The STOP should be conducted after all the parties agree that:

- The site has been adequately characterized;
- The site does not pose an unacceptable risk to human health;
- The SVE system has been optimally designed;
- Performance monitoring indicates that the site conceptual model is accurate;
- Contaminant removal rates have stabilized and approached asymptotic levels, following one or more temporary shutdown periods; and
- The SVE system has been optimized to the greatest extent possible.

The decision to continue operation for an SVE system will depend upon the analysis of the three criteria listed below. It is always technically possible to remove more mass, but eventually whether to continued operations requires evaluating the tradeoff between certain monetary expenditure and uncertain environmental benefit. If the remaining contaminant mass in the vadose zone will not reach the groundwater, additional remediation will not be warranted. If the contaminant concentration in the leachate entering the aquifer from the vadose zone is below the aquifer cleanup level (MCLs), the aquifer will not be unacceptably degraded further. Lower cleanup levels may be achievable, but the additional cleanup required to reach them would likely not be justified. Several lines of evidence must be used to make this professional judgment since measuring actual leachate concentrations may be technically impractical and predicting leachate concentrations via modeling might be inaccurate.

This process represents a compromise of the various parties' policies and should be used as a guide in preparing the SCOU Part 2 Record of Decision.

Decision Criteria

The decision to continue SVE will be based on scientific, economic, and engineering judgment using the following criteria in sequence. The Air Force and the regulatory agencies acknowledge that there is uncertainty inherent in all of the elements used in the STOP, and that consensus is necessary to determine the levels of uncertainty that are acceptable in each of the elements.

I. Will the residual mass in the vadose zone reach the groundwater?

To answer this question, STOP elements "a" through "f" must be addressed.

- If the answer is "no", then proceed with site closure.
- If the answer is "yes" or "unknown", then proceed to criterion II.

II. Will the residual mass in the vadose zone cause the contaminant concentrations in the leachate to exceed the aquifer cleanup level?

To answer this question, STOP elements "a" through "g" must be addressed.

- If the answer is "no", then proceed with site closure.
- If the answer is "yes", or "unknown", then proceed to criterion III which requires a complete STOP.

III. Based on an evaluation of all of the elements, is it appropriate to permanently shut-off the SVE System?

To answer this question, all STOP elements must be addressed.

- If the answer is "yes", then shut off the SVE system and proceed with site closure.
- If the answer is "no" continue SVE operation or develop alternate remedial strategy.

Elements of the STOP

The following elements should be applied to evaluate the criteria listed above.

a. What is the estimated residual contaminant mass and areal and vertical extent of the remaining vadose zone contaminant plume? Include contaminant isoconcentration maps and plume cross-sections to illustrate the contaminant concentrations and distribution in the subsurface.

b. Do the data indicate migration towards the groundwater? Qualitative answers to this question may be either "yes", "no" or "unable to make a determination". Evidence for migration towards groundwater may include such lines of evidence as: 1) increasing contaminant concentrations in onsite monitoring wells; 2) pre-remediation soil gas profiles from nested wells to estimate the contaminant's propensity for migration; and 3) post-remediation time-series profiles of soil gas concentrations in nested wells.

c. What is the lithology of areas that do and do not demonstrate rebounds in soil gas concentration? Use site-specific information, and include as much information as possible, such as porosity, moisture content and carbon content of soil, etc.

d. What are the actual site specific infiltration and percolation rates? If site specific data are not available, what are the predicted rates?

e. Are there sufficient historical groundwater monitoring data for wells at or adjacent to the site to determine whether the vadose zone plume has or has not impacted the groundwater? (This determination may not be possible due to active groundwater extraction in the area.)

f. Are there any other site specific factors that should be considered in the evaluation such as site history and physical characteristics (e.g. organic carbon, biodegradation)? Factors to consider for this element include: 1) the nature of the release (for example: one-time spill or continued release over time?; how long ago the release occurred or ceased?; was the release to surface soil, or through a conduit to the subsurface such as a French drain, dry well, or leaking sewer line?, etc.) and 2) any site-specific physical characteristics that may enhance or retard the contaminants subsurface migration (such as unusual presence or absence of low permeability layers, high carbon content of soil, etc.).

g. What is the actual or predicted concentration and mass flux rate of leachate leaving the vadose zone?

h. What was the mass removal rate prior to SVE shutdown?

i. What are the VOC concentration and cumulative mass removed expressed as a function of time?

j. How much money has been spent to date on the site's remediation?

k. Are further enhancements to the SVE systems predicted to be technically- or cost-effective?

l. What are the locations and capture zones of operating groundwater extraction wells relative to the vadose zone contaminant plume? Will the existing wells effectively capture the contaminants from the site? If not, what are the additional costs to add groundwater wells?

m. What is the incremental cost over time of vadose zone remediation compared to the incremental cost over time for groundwater remediation provided that the underlying contamination has not reached aquifer cleanup levels? In other words, will the residual mass in the vadose zone significantly prolong the time and increase the cost to attain the aquifer cleanup level?

To implement this element, the following costs need to be calculated:

- The cost to reach the aquifer cleanup level *without* the additional impact from the site (GW_0);
- The cost to reach the aquifer cleanup level *with* the additional impact from the site (GW_1);
- The cost to reach the aquifer cleanup level *with* the additional impact from the site after an additional period of SVE operation (GW_2); and
- The cost of the additional SVE operation (SVE_1).

These costs can be calculated following the steps outlined below:

1. Estimate the predicted time required for the groundwater extraction system to reach aquifer cleanup level(s) in the vicinity of the site *without* additional impact from the site.
2. Estimate the monthly cost to continue operation of the groundwater extraction system in the area impacted by the site?
3. Calculate the cost to reach the aquifer cleanup level (GW_0) in the vicinity of the site *without* the additional impact from the site by multiplying the results of step 1 above by the results of step 2 above. (GW_0 = step 1 x step 2).
4. Using the measured residual soil gas concentrations at the site, calculate the mass of the residual contaminant in the vadose zone (same as element "a").
5. Estimate the site's potential impact to groundwater using appropriate vadose zone and groundwater fate and transport models.
6. Estimate the time to reach the groundwater aquifer cleanup level using the modeling results obtained in step 5 above.
7. Estimate the monthly cost to continue operation of the groundwater extraction system in the area impacted by the site?
8. Calculate the cost to reach the aquifer cleanup level *with* the additional impact from the site (GW_1) by multiplying the results of step 6 by the results of step 7. (GW_1 = step 6 x step 7).
9. Estimate the monthly cost of continuing to operate the SVE system based on historical costs (including operation and shutdown periods for the site).

10. Estimate the cost to run SVE system for an agreed-upon length of time that is based on site-specific conditions, such as 6 months (SVE_1), by multiplying the agreed upon length of time by the results of step 9. (SVE_1 = length of time x step 9).
11. Estimate what the predicted residual soil gas concentrations would be if the SVE system was operated for the additional agreed-upon length of time.
12. Estimate the impact to groundwater from the site based on the results of step 11. This estimation can be conducted similarly to step 5 above.
13. Estimate the predicted time required for groundwater extraction system to reach aquifer cleanup level *with* the additional impact from the site after operation of the SVE system for an additional period of time.
14. Calculate the cost to reach the aquifer cleanup level (GW_2) *with* the additional impact from the site after operation of the SVE system for an additional period of time. This cost is calculated by multiplying the results of step 13 by the results of step 2. (GW_2 = step 13 x step 2).
15. Compare the costs of groundwater extraction *without* additional SVE at the site to the costs of groundwater extraction *with* additional SVE at the site. Is the cost of groundwater extraction without additional SVE at the site greater than or equal to the cost of groundwater extraction with SVE at the site plus the additional SVE costs.? Is this cost savings to the GW system worth the expense of continued SVE for an additional amount of time? Mathematically, this can be expressed as:

$$\text{Is} \quad (GW_1 - GW_0) \leq (SVE_1) + (GW_2 - GW_0)?$$

Implementation

The Air Force will operate the SVE system until it demonstrates that the cleanup goal set forth above has been met. The Air Force, the USEPA, and the State (DTSC and the RWQCB) will jointly decide based on the STOP evaluation whether the SVE system may be permanently shut off. The STOP should be implemented in a phased approach, with the less complex criteria (criteria I and II described above) being evaluated first. Evaluation of these two criteria may indicate that the SVE system can be shut off, without having to perform a complete STOP (criterion III).

There are several potential outcomes of the STOP evaluation. Ideally, the STOP would indicate that the SVE system could be permanently turned off, and all parties agree that the site could be closed. Another potential outcome is that the STOP would indicate that the SVE system could be permanently shut off, but that the site may not yet be suitable for closure, based on remaining threats to the environment or water quality. In this case, additional discussion between the parties is necessary to determine what course of action is warranted, such as alternate remedial measures or long-term monitoring. The STOP may also indicate that additional SVE is warranted at the site prior to permanent system shut off.

Due to the reliance of the STOP on professional judgment, another outcome of the STOP is that the parties may not agree on whether the SVE system can be shut off or not. If the parties cannot reach a joint resolution, any party may invoke dispute resolution.

US EPA: RPM	*DRAFT* Lisa Hanusiak
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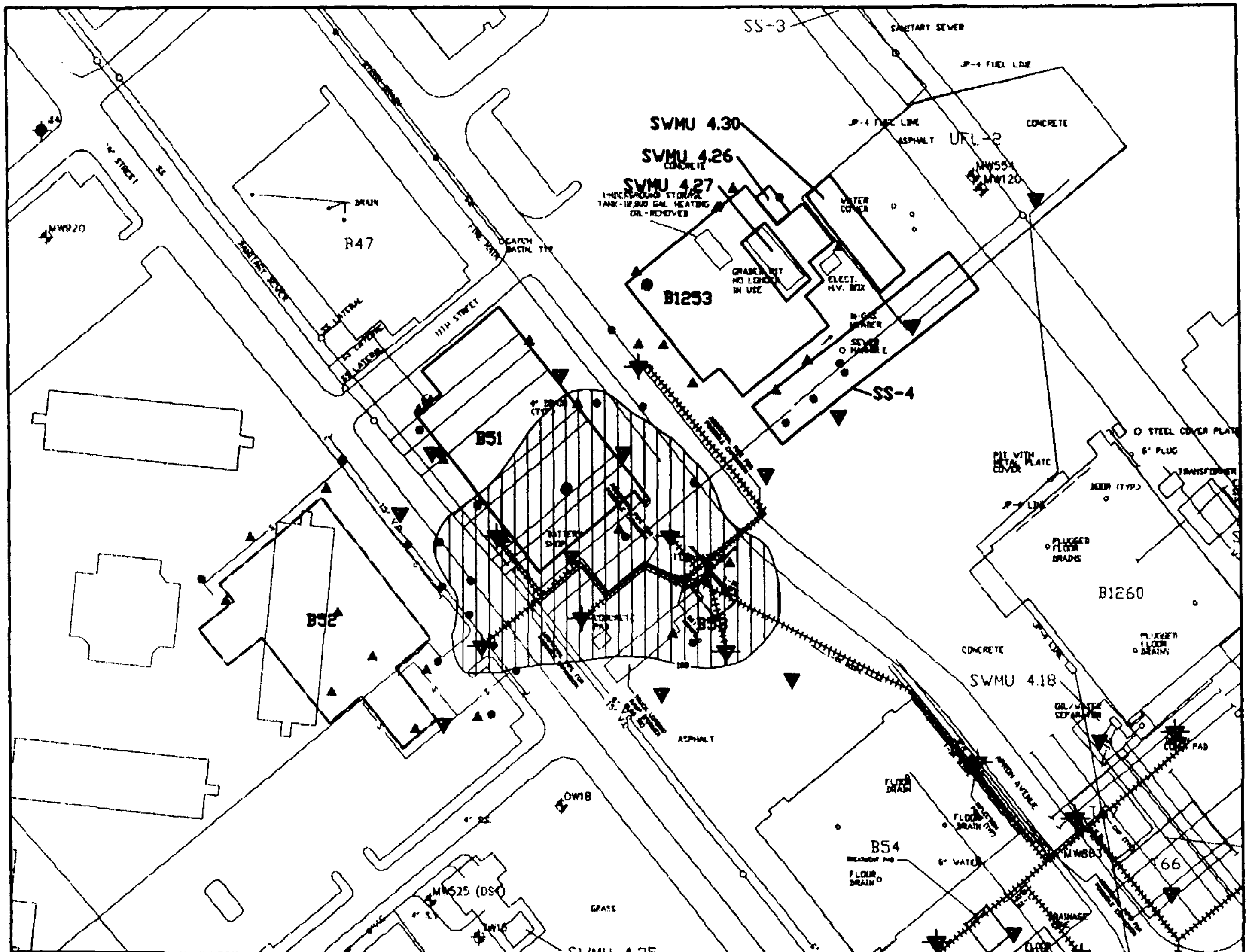
APPENDIX E

SITE MAPS



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: B51 **GRID:** R11

LINKED SITES: B52, B53, B1253 and SWMUs 4.26, 4.27 and 4.30

DESCRIPTION: Aircraft maintenance facilities. Major site activities/features included engine cleaning (degreasing) and electroplating, corrosion control, paint stripping, solvent distillation and a 90-day hazardous waste accumulation pad. See Section 3.1.3.1

CONTAMINANTS OF CONCERN	
BHHRA	WQSA
	TCE

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.4E-06	0.001
GW:	1.9E-05	1.4
COMBINED:	1.9E-05	1.4

ECOLOGICAL HABITAT: None

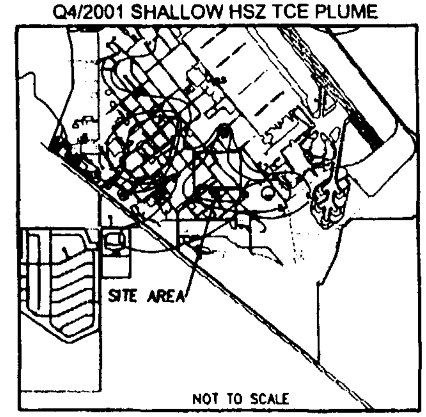
SELECTED REMEDY: SVE — **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.4E-06	0.001
GW:	1.5E-06	0.05
COMBINED:	1.5E-06	0.05

DECISION PROCESS COMMENTS: SCOU FS preferred alternative and the selected remedy (SCOU ROD 2) is SVE. The selected remedy for VOC contamination at the Sewer Segment 4 (SS-4) site is also SVE (SCOU ROD 2). Given proximity, the SVE system installed and operating at the B51 Group site is addressing the VOC contamination at SS-4.

STATUS: SVE system (integrated with the B54 Group site) installed and operating as a CERCLA removal action. System startup on 8 August 2001. Portion of system addressing VOC contamination at the B51 Group site (and the SS-4 site) consists of six vapor extraction wells and associated piping and 11 vapor monitoring wells. The treatment unit (vapor-phase GAC) is located within the B54 Group site (see Figure 3-2). To date (30 March 2002) the system has removed 2,733 pounds of VOCs and fuels from the vadose zone (total for B51 Group and B54 Group sites). More details in Section 6.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- Building
- Site Boundary
- Background Feature
- Injection Well
- Monitoring Well
- Soil Boring
- Soil Gas Boring
- Hand Auger
- Nested Vapor Extraction Well
- Nested Vapor Monitoring Well
- Demolished Building
- SVE Piping
- SVE SYSTEM

100 TCE in Soil Gas >100 μg/L Prior to Remediation (15–50 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report*. Prepared for AFCEE, Brooks AFB, Texas. November.

Source: MWH, 2002a. *Draft Final Operation and Maintenance Manual, Building 51 Group and Building 54 Group Soil Vapor Extraction System*. Prepared for AFCEE, Brooks AFB, Texas. April.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

20 0 20 40 60 80 100
Scale in Feet
1:1200

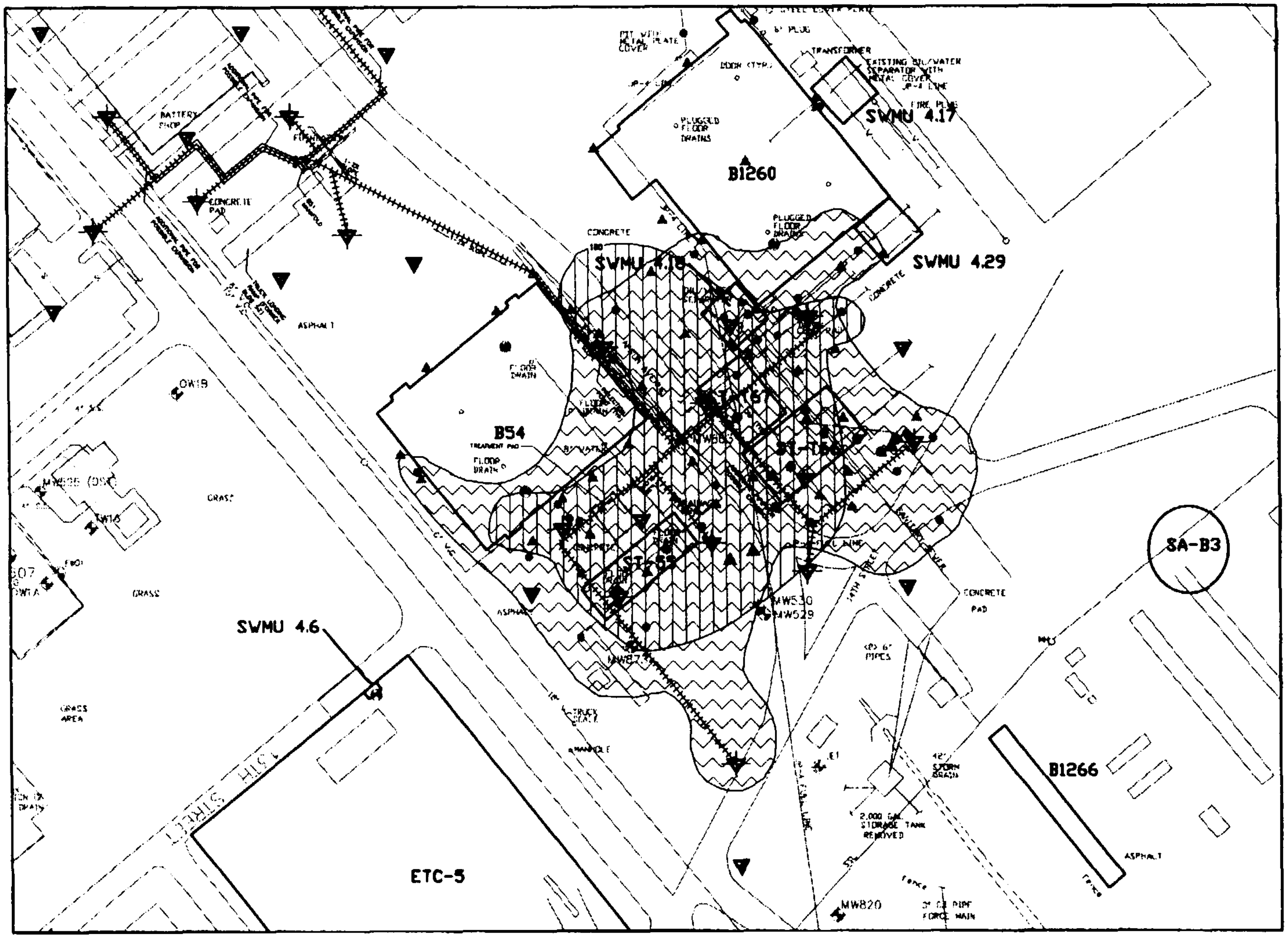
B51 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv ..\cadd\05201001\cbpart2\cb2_basewide.dwg
6/17/02 Xv

Job No. 05-2010-01

FIGURE E-1



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: B54 **GRID:** R12

LINKED SITES: B1260, B1266, ST-55, ST-T66, ST-T67, ETC-5, SA-B3 and SWMUs 4.6, 4.17, 4.18 and 4.29

DESCRIPTION: Aircraft engine and vehicle maintenance facilities. Major site activities/features included jet engine and parts cleaning (degreasing), a washrack, jet engine assembly and general maintenance, hazardous materials storage, and a vehicle maintenance and parking area. See Section 3.1.3.2.

CONTAMINANTS OF CONCERN	
BHHRA	WQSA
	TCE

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	3.0E-08	0.001
GW:	6.6E-05	4.8
COMBINED:	6.6E-05	4.8

ECOLOGICAL HABITAT: None

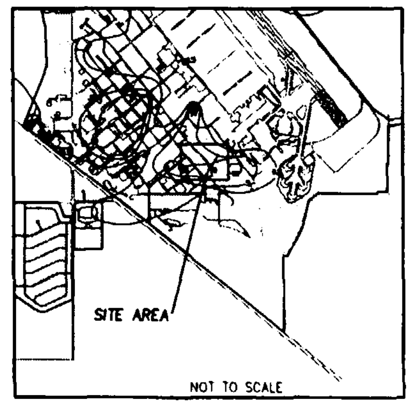
SELECTED REMEDY: SVE/BV — **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	3.0E-08	0.001
GW:	1.4E-06	0.04
COMBINED:	1.4E-06	0.04

DECISION PROCESS COMMENTS: SCOU FS preferred alternative and the selected remedy (SCOU ROD 2) is SVE followed, if necessary, by bioventing

STATUS: SVE system (integrated with the B51 Group site) installed and operating as a CERCLA removal action. System startup on 8 August 2001. Portion of system addressing VOC contamination at the B54 Group site consists of nine vapor extraction wells and associated piping and seven vapor monitoring wells. The treatment unit (vapor-phase GAC) is located within the B54 Group site. To date (30 March 2002) the system has removed 2,733 pounds of VOCs and fuels from the vadose zone (total for B51 Group and B54 Group sites). More details in Section 8.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- Building
- Site Boundary
- Background Feature
- Drainage Feature
- SVE Piping
- Monitoring Well
- Extraction Well
- Soil Boring
- Soil Gas Boring
- Hand Auger
- Nested Vapor Extraction Well
- Nested Vapor Monitoring Well

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

SVE SYSTEM

Extent of TCE, PCE and TPH Contamination in Soil Prior to Remediation (0–50 ft. bgs)
Source: MWH, 2001 (Unpublished Presentation Material). SVE/Bioventing Removal Action–Building 51 Group/Building 54 Group.

TCE in Soil Gas >100 μg/L Prior to Remediation (5 to 60 ft. bgs)
Source: Jacobs. 1997. *Final Castle Airport–SCOU RI/FS*. Prepared for AFCEE, Brooks AFB, Texas. May.

Source: MWH, 2002a. *Draft Final Operation and Maintenance Manual, Building 51 Group and Building 54 Group Soil Vapor Extraction System*. Prepared for AFCEE, Brooks AFB, Texas. April.

N

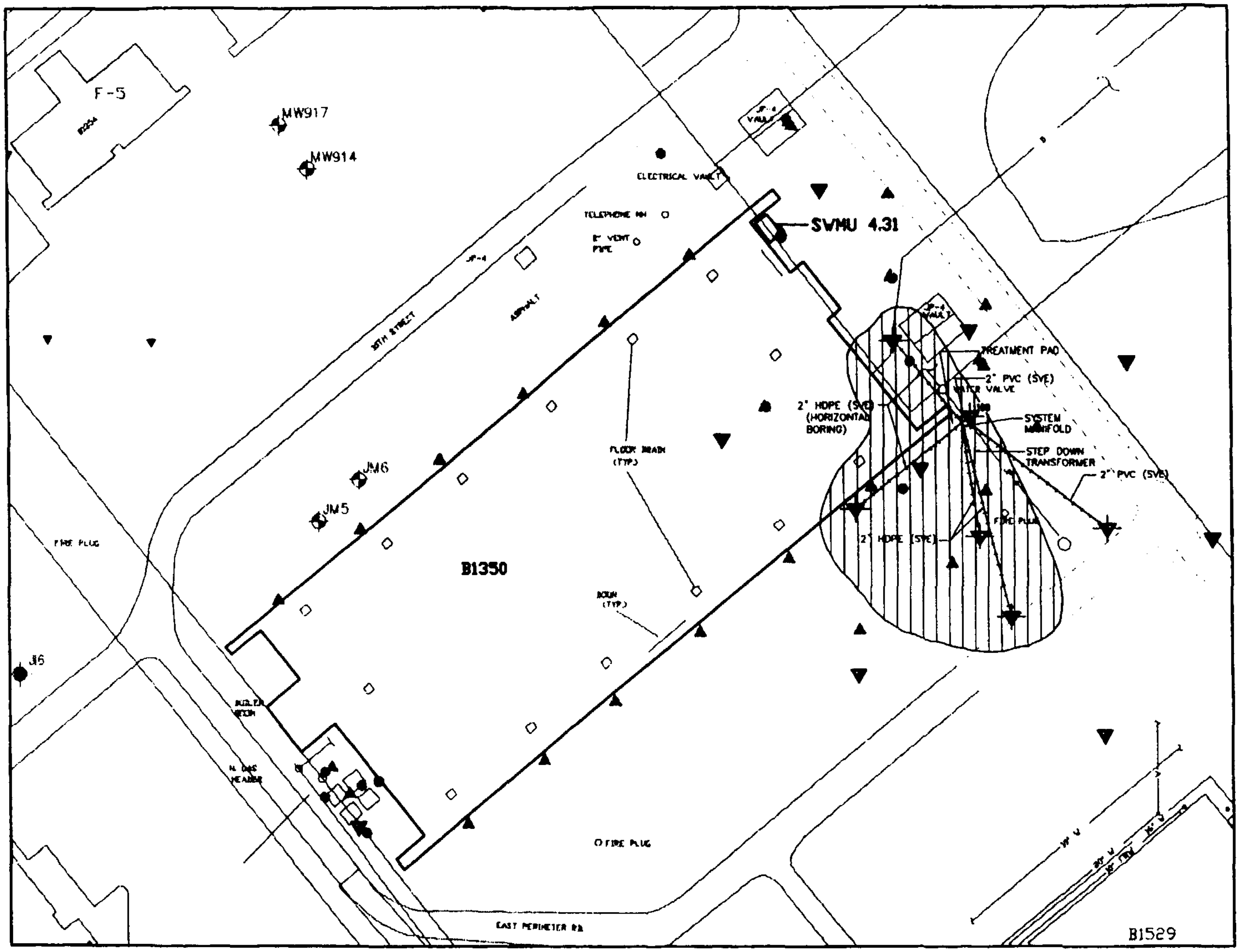
20 0 20 40 60 80 100
Scale In Feet
1:1200

B54 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv ..\cadd\05201001\cbpart2\cb2_basewide.dwg
5/17/02 Xv
Job No. 05-2010-01

FIGURE E-2



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: B1350 **GRID:** Q12
LINKED SITES: SWMU 4.31
DESCRIPTION: Aircraft maintenance facility. Major site activities included repair and overhaul of hydraulic and electrical systems and other general aircraft maintenance. See Section 3.1.3.7.

CONTAMINANTS OF CONCERN	
~~SHHRA~~	~~WQSA~~
	Diesel, TCE, PCE

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.2E-08	0.0002
GW:	2.2E-06	0.4
COMBINED:	2.2E-06	0.4

ECOLOGICAL HABITAT: None

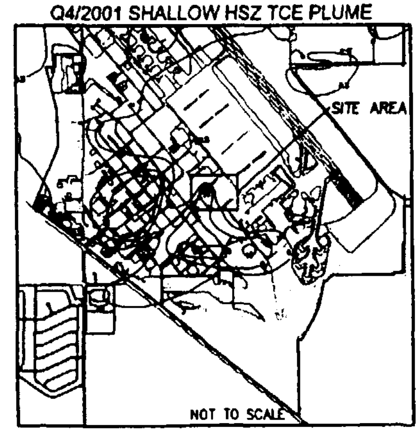
SELECTED REMEDY: SVE/IR — **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.2E-08	0.0002
GW:	1.1E-06	0.03
COMBINED:	1.1E-06	0.03

DECISION PROCESS COMMENTS: SCOU FS preferred alternative and the selected remedy (SCOU ROD 2) is SVE followed, if necessary, by intrinsic remediation.

STATUS: SVE system installed and operating as a CERCLA removal action. System startup on 9 October 2001. The system consists of six vapor extraction wells and piping connecting these wells to a vapor-phase GAC treatment unit. There are eight vapor monitoring wells. To date (30 March 2002) the system has removed approximately 106 pounds of VOCs from the vadose zone. More details in Section 6.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



LEGEND

- Building
- Site Boundary
- Site Feature
- Background Feature
- Monitoring Well
- Injection Well
- Soil Boring
- Soil Gas Boring
- Nested Vapor Extraction Well
- Nested Vapor Monitoring Well
- SVE Piping
- SVE SYSTEM

100 TCE in Soil Gas >100 µg/L Prior to Remediation (25–45 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report.* Prepared for AFCEE, Brooks AFB, Texas. November.
Source: MWH, 2002b. *Draft Final Operation and Maintenance Manual, Building 1762, Building 1350 and Discharge Area 5 Soil Vapor Extraction System.* Prepared for AFCEE, Brooks AFB, Texas. April.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

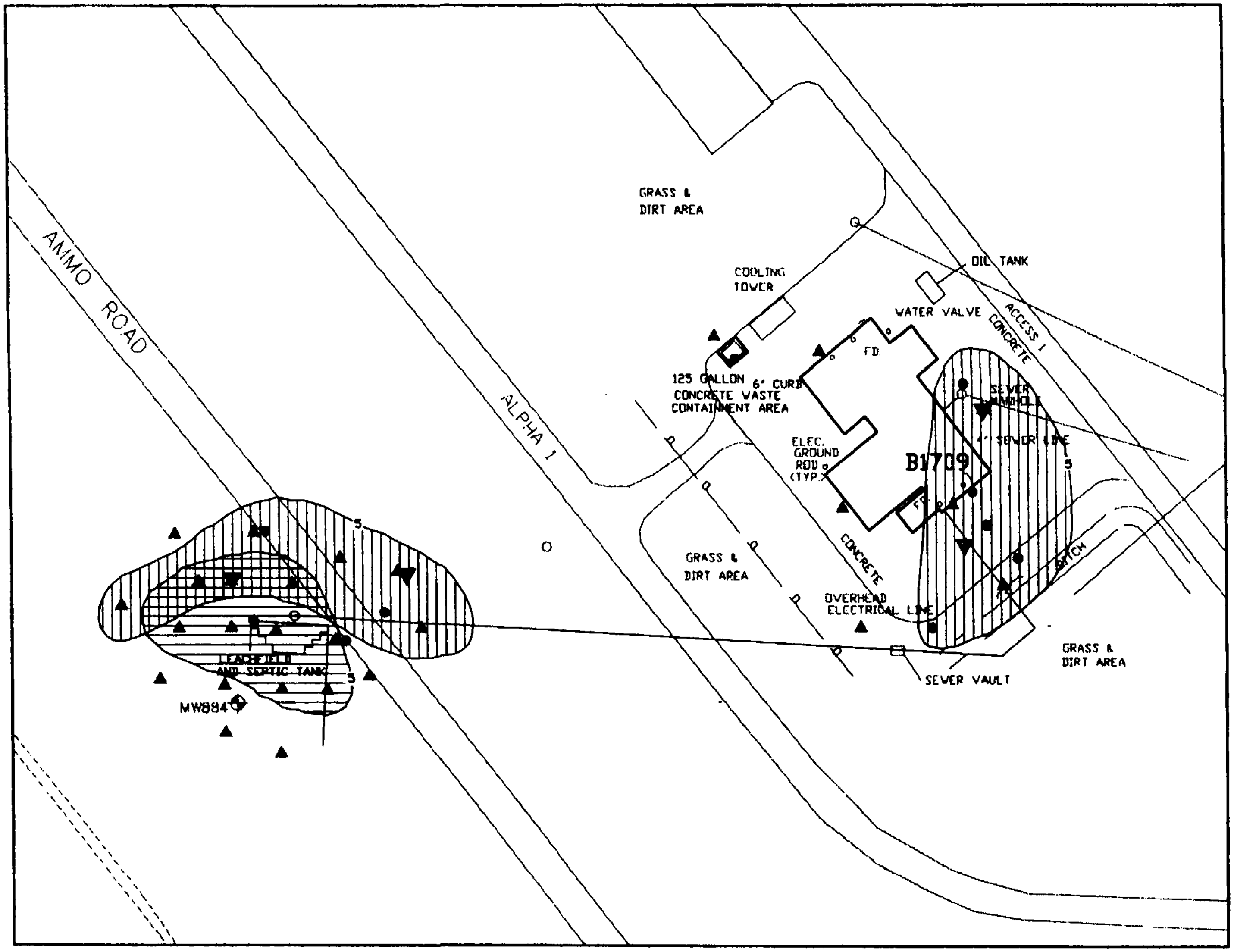
20 0 20 40 60 80 100
Scale In Feet
1:1200

B1350 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv
6/17/02 Xv ..\cadd\05201001\cbpart2\cb2_bsaside.dwg Job No. 05-2010-01

FIGURE E-3



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: B1709 **GRID:** L13

LINKED SITES: None

DESCRIPTION: Special weapons maintenance shop. Maintenance activities used solvents, paints and cleaning compounds. The sewer line serving the building leads to a septic tank and leachfield. See Section 3.1.3.12.

CONTAMINANTS OF CONCERN

BHHRA	WQSA
	TCE (<WQSA)

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	0.0E+00	0
GW:	4.7E-07	0.1
COMBINED:	4.7E-07	0.1

ECOLOGICAL HABITAT: None

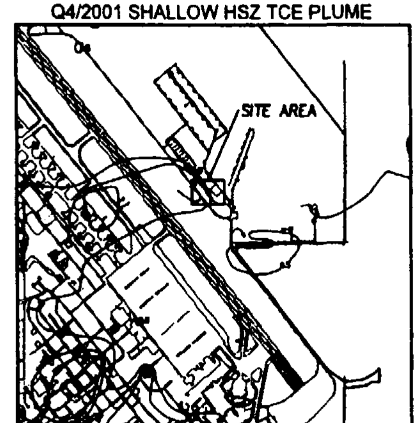
SELECTED REMEDY: SVE **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	0.0E-00	0
GW:	9.1E-07	0.03
COMBINED:	9.1E-07	0.03

DECISION PROCESS COMMENTS: SCOU FS preferred alternative was NFA. However, based on the presence of VOCs exceeding re-evaluated VLEACH criteria, the selected remedy (post-FS BCT decision) is SVE (SCOU ROD 2).

STATUS: Site evaluated as part of SVE Decision Study (Earth Tech, 2000). Four vapor monitoring wells installed. Pilot testing prior to SVE implementation reduced TCE concentrations to below re-evaluated VLEACH criteria. Closure report (START evaluation) pending. More details in Section 6.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

Building
Site Boundary
Site Feature
Background Feature
Monitoring Well
Soil Boring
Soil Gas Boring
Nested Vapor Monitoring Well

TCE in Soil Gas >5 μg/L Prior to Remediation (5 to 50 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report*. Prepared for AFCEE, Brooks AFB, Texas. November.

Vinyl Chloride in Soil Gas >5 μg/L Prior to Remediation (5 to 10 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report*. Prepared for AFCEE, Brooks AFB, Texas. November.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

14 0 70
Scale in Feet
1:840

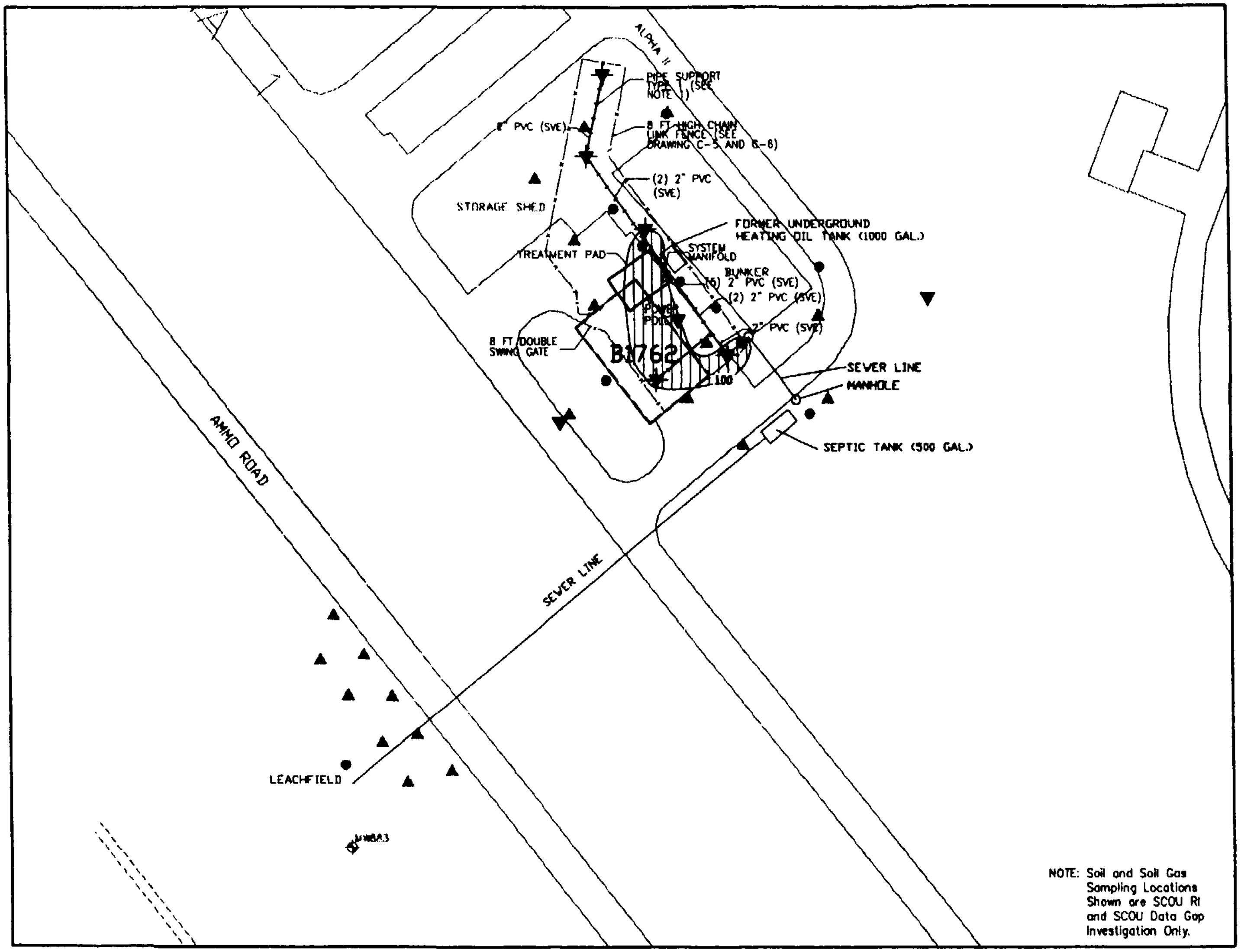
B1709 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv ..\cadd\05201001\cbpart2\cb2_basewide.dwg
6/17/02 Xv

Job No. 05-2010-01

FIGURE E-4



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: B1762 **GRID:** K13

LINKED SITES: None

DESCRIPTION: Weapons and aircraft maintenance shop. General maintenance activities used fuels, solvents and paints. The sewer line serving the building leads to a septic tank and leachfield. See Section 3.1.3.13.

CONTAMINANTS OF CONCERN	
BHHRA	WQSA
	TCE

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.9E-08	0.0004
GW:	5.6E-07	0.2
COMBINED:	5.8E-07	0.2

ECOLOGICAL HABITAT: None

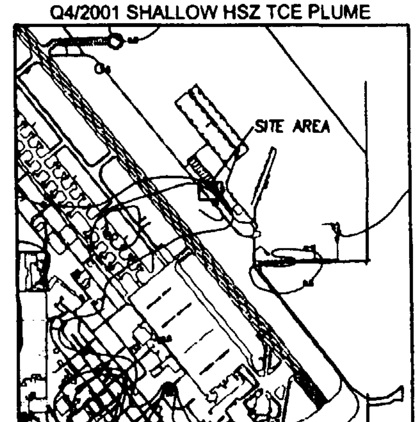
SELECTED REMEDY: SVE **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.9E-08	0.0004
GW:	2.0E-06	0.06
COMBINED:	2.0E-06	0.06

DECISION PROCESS COMMENTS: SCOU FS preferred alternative and the selected remedy (SCOU ROD 2) is SVE.

STATUS: SVE system installed and operating as a CERCLA removal action. System startup on 3 December 2001. The system consists of five vapor extraction wells and piping connecting these wells to a vapor-phase GAC treatment unit. There are three vapor monitoring wells. To date (30 March 2002) the system has removed approximately 41 pounds of VOCs from the vadose zone. More details in Section 6.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- Building
- Site Boundary
- Site Feature
- Background Feature
- Monitoring Well
- Soil Boring
- Soil Gas Boring
- SVE Piping
- Nested Vapor Extraction Well
- Nested Vapor Monitoring Well
- Demolished Building
- SVE SYSTEM

100 TCE in Soil Gas >100 µg/L Prior to Remediation (0–25 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report.* Prepared for AFCEE, Brooks AFB, Texas. November.

Source: MWH, 2002b. *Draft Final Operation and Maintenance Manual, Building 1762, Building 1350 and Discharge Area 5 Soil Vapor Extraction System.* Prepared for AFCEE, Brooks AFB, Texas. April.

N

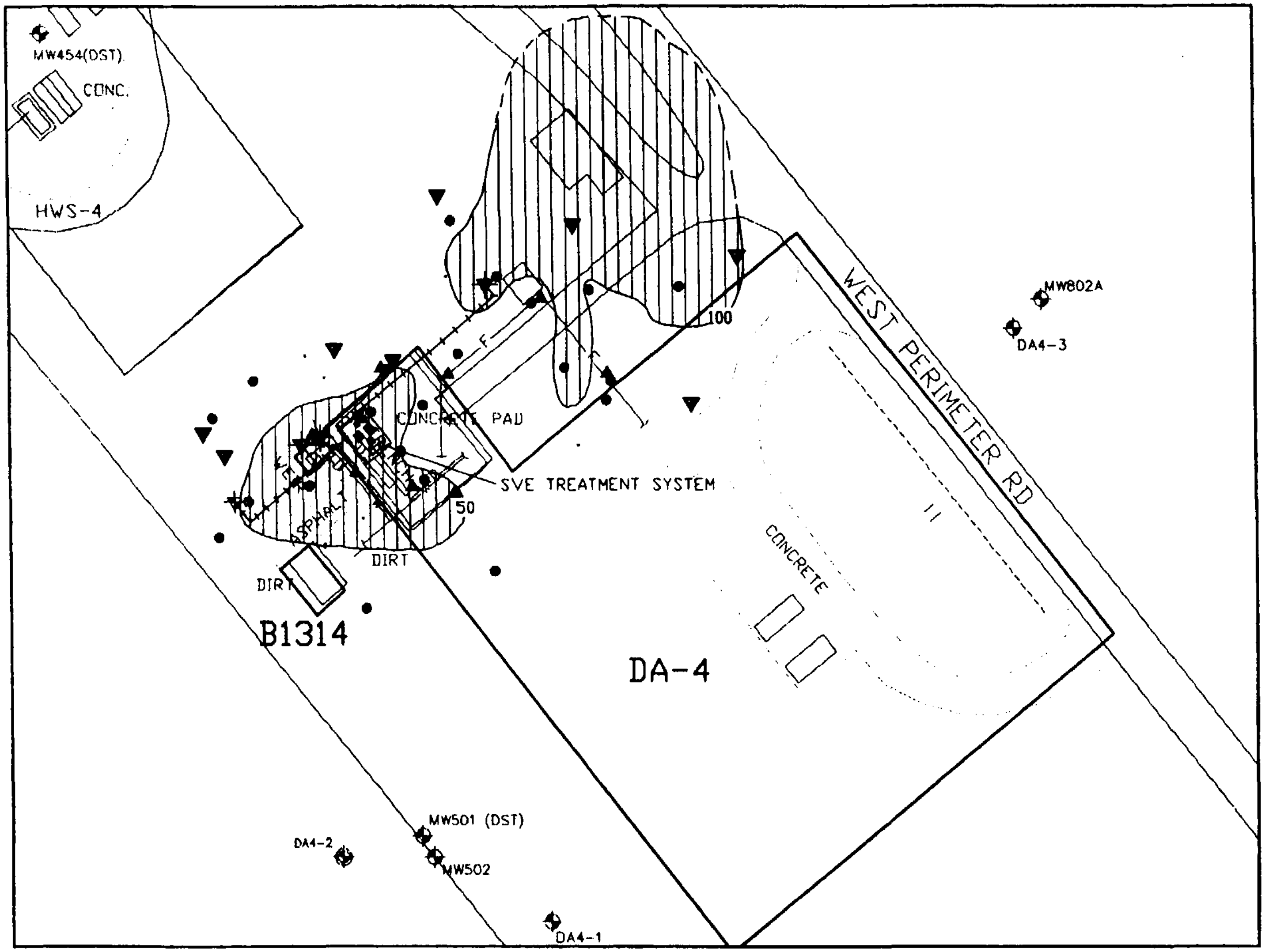
14 0 70
Scale in Feet
1:840

B1762 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv 6/17/02 Xv ..\cadd\05201001\cbpart2\cb2_basevide.dwg Job No. 05-2010-01

FIGURE E-5



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: DA-4 **GRID:** K6

LINKED SITES: B1314

DESCRIPTION: Liquid oxygen manufacturing and storage facility from the early 1950s until the mid 1980s. Solvents, including TCE, were used to clean filters and then discharged to a shallow trench and French drain system. See Section 3.1.3.18.

CONTAMINANTS OF CONCERN	
SHHRA	WQSA
	TCE

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	4.9E-08	0.003
GW:	1.8E-05	0.7
COMBINED:	1.8E-05	0.7

ECOLOGICAL HABITAT: Marginal

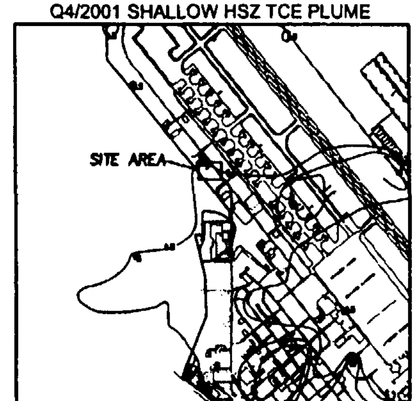
SELECTED REMEDY: SVE **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	4.9E-08	0.003
GW:	5.7E-07	0.02
COMBINED:	6.2E-07	0.02

DECISION PROCESS COMMENTS: SCOU FS preferred alternative and the selected remedy (SCOU ROD 2) is SVE.

STATUS: SVE system installed and operated as a CERCLA removal action from August 1996 through January 1997. The system consists of four vapor extaction wells and piping connecting these wells to a vapor-phase GAC treatment unit. There are eight vapor monitoring wells, two of which were intermittently connected to the system. During 1996-1997, the system removed approximately 300 pounds of VOCs from the vadose zone. The BCT subsequently decided that closure was not warranted and that SVE operation should continue. The existing system was operated from November 2001 through May 2002. Reporting of results for this second period of SVE operation is pending. More details in Section 6.1.4.7.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

Building
Site Boundary
Base Boundary
Background Feature
SVE Piping
Soil Boring
Monitoring Well
Extraction Well
Soil Gas Boring
Single Vapor Extraction Well
Nested Vapor Monitoring Well
Nested Vapor Extraction Well

50 Approximate Extent of TCE in Soil Gas >50 or 100 μg/L Prior to Remediation (20 ft. bgs)
Source: Jacobs. 1997. *Final Castle Airport-SCOU RI/FS.* Prepared for AFCEE, Brooks AFB, Texas. May.

SVE SYSTEM Source: Jacobs, 1998. *DA-4 Closure Report*. Prepared for AFCEE, Brooks AFB, Texas. April.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

N

10 0 10 20 30 40 50
Scale in Feet
1:600

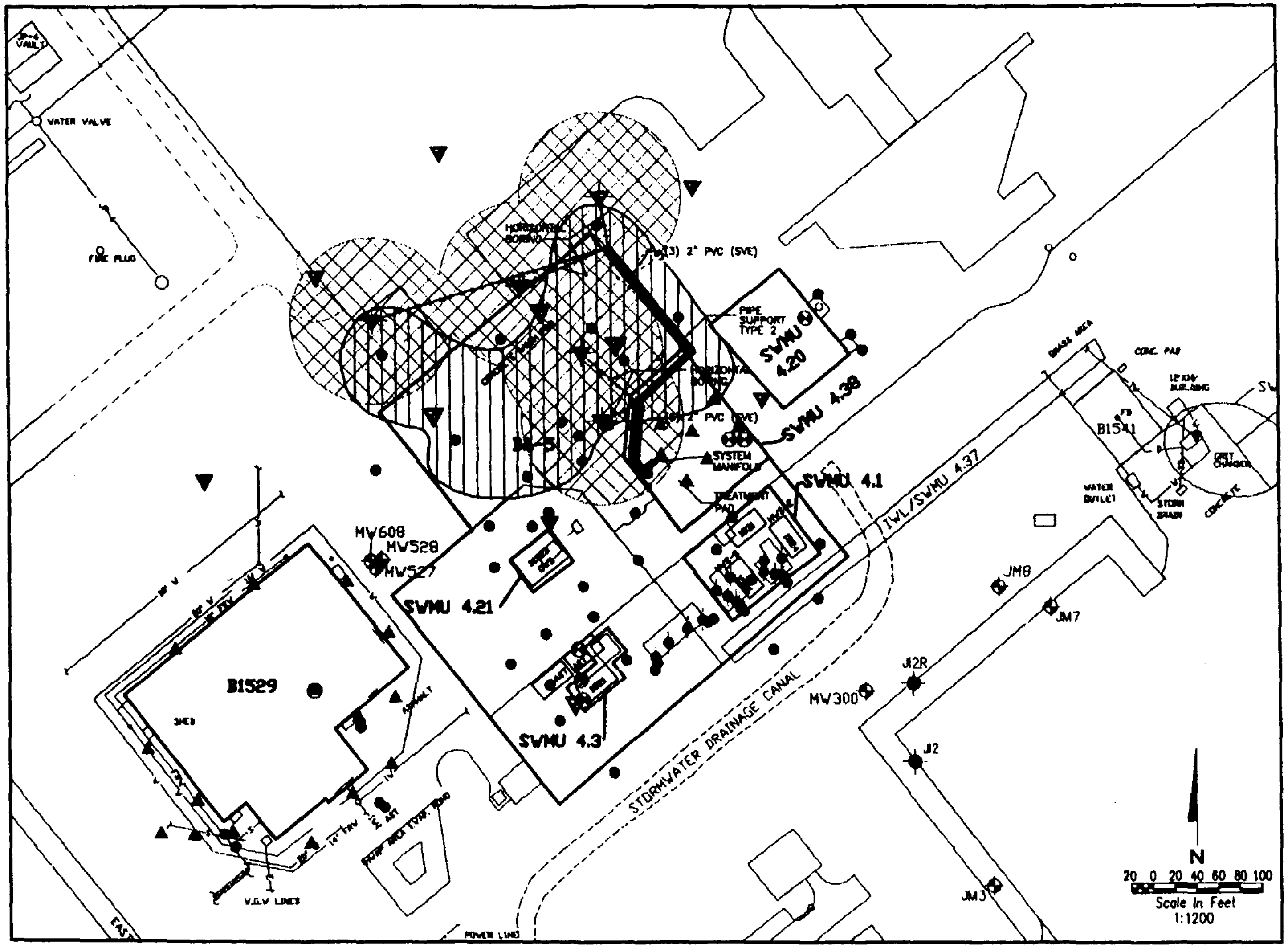
DA-4 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv
4/17/02 Xv
_\cadd\05201001\cbpart2\cb2_basewide.dwg

Job No. 05-2010-01

FIGURE E-6

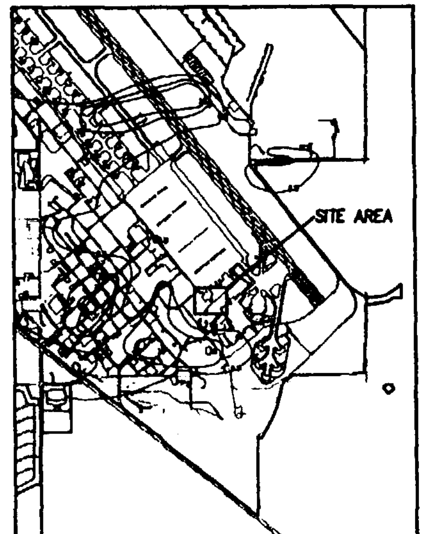


DA-5 SITE SUMMARY	
SITE: DA-5	GRID: Q13
LINKED SITES: B1529, and SWMUs 4.1, 4.20, 4.21, 4.3 and 4.38	
DESCRIPTION: System of drainage features and pipelines adjacent to the main aircraft washrack (B1529). Associated facilities include two hazardous waste storage areas, two oil/water separators, an equipment storage building and a catchment basin.	
STATUS: SVE system installed and operating as a CERCLA removal action. System startup on 8 October 2001. The system consists of five vapor extraction wells and piping connecting these wells to a vapor-phase GAC treatment unit. There are nine vapor monitoring wells. To date (12 June 2002) the system has removed approximately 134 pounds of VOCs and fuels from the vadose zone.	

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

SVE System Source: MWHA, 2002c. *Draft Final Operation and Maintenance Manual, Building 1762, Building 1350 and Discharge Area 5 Soil Vapor Extraction System.* Prepared for AFCEE, Brooks AFB, Texas. April.

SITE LOCATION WITH RESPECT TO THE Q2/2002 SHALLOW HSZ TCE PLUME



NOT TO SCALE

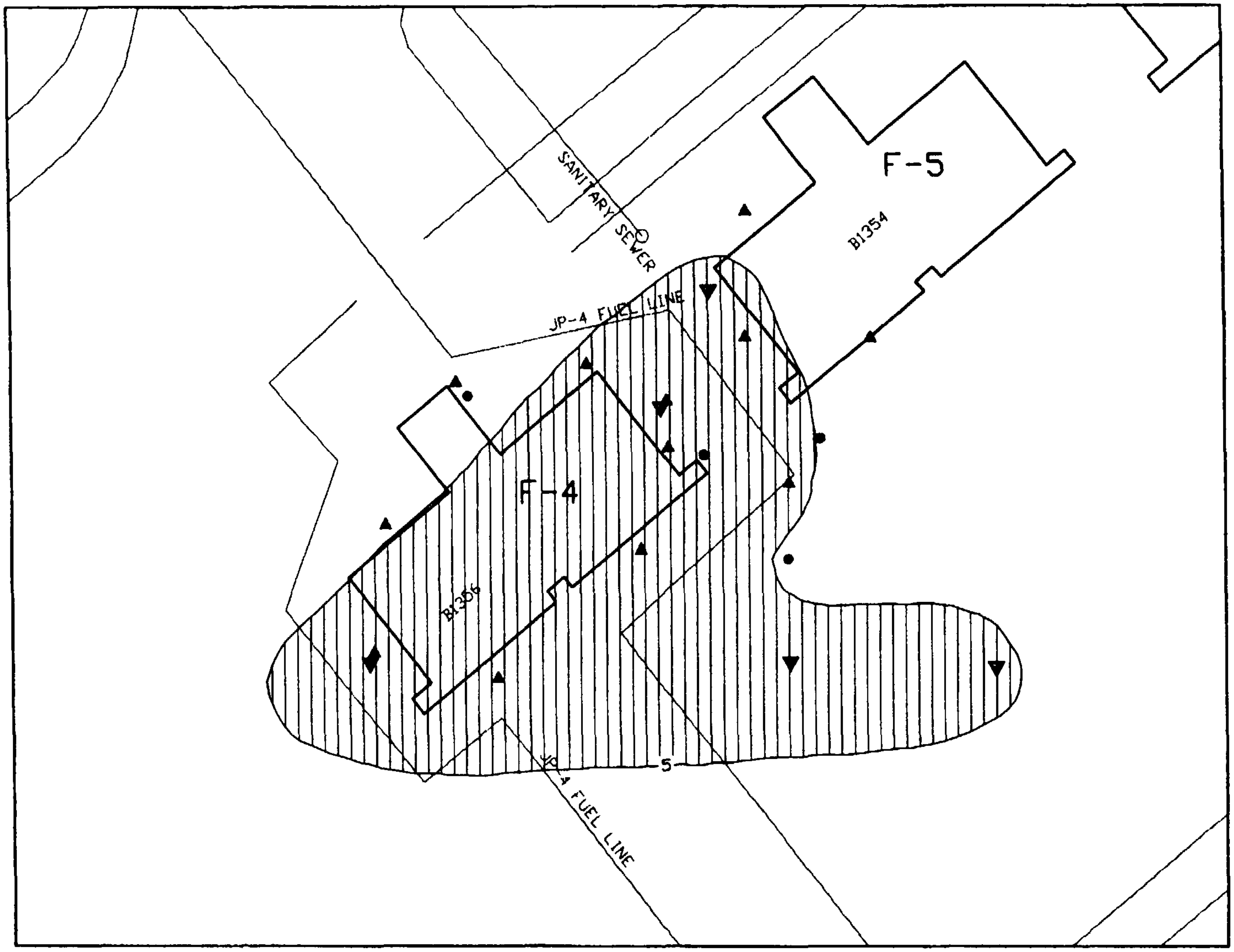
LEGEND

- Building
- Site Boundary
- Site Feature
- Background Feature
- Drainage Feature
- Monitoring Well
- Injection Well
- Surface Scrape
- Hand Auger
- Removed Feature
- Soil Boring
- Soil Gas Boring
- Nested Vapor Extraction Well (with estimated Radius of Influence)
- Nested Vapor Monitoring Well
- SVE Piping
- VOCs in Soil Gas >5 µg/L Prior to Remediation (10 to 20 ft. bgs)
  Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report.* Prepared for AFCEE, Brooks AFB, Texas. November.
- Approximate extent of SVE Influence (ROI)

4/17/01 ...
02/13/03 ...
Job No. 05-2010-01

DA-5 Site Map
OPS Demonstration
Castle Airport

FIGURE E-7



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: F-4 **GRID:** Q11
LINKED SITES: F-5, F-6
DESCRIPTION: Aircraft hanger. General aircraft maintenance activities were presumably conducted in and around the hanger. An underground JP-4 pipeline passes through the site. See Section 3.1.3.27.

CONTAMINANTS OF CONCERN	
BHHRA	WQSA
	TCE (<WQSA)

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.1E-08	0.0001
GW:	1.9E-07	0.1
COMBINED:	2.1E-07	0.1

ECOLOGICAL HABITAT: None

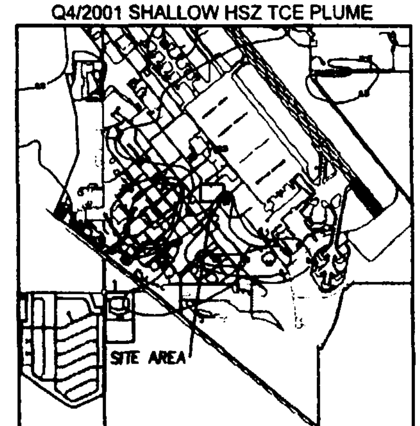
SELECTED REMEDY: SVE — **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	2.1E-08	.0001
GW:	1.1E-06	0.03
COMBINED:	1.1E-06	0.03

DECISION PROCESS COMMENTS: SCOU FS preferred alternative was NFA. However, based on the presence of VOCs exceeding re-evaluated VLEACH criteria, the selected remedy (post-FS BCT decision) is SVE (SCOU ROD 2).

STATUS: Site Evaluated in SVE Decision Study (Earth Tech, 2000). Five vapor monitoring wells installed. Pilot testing prior to SVE implementation reduced TCE concentrations to below re-evaluated VLEACH criteria. Closure report (START evaluation) pending. More details see Section 6.1.4.7. Further characterization of petroleum hydrocarbon contamination at site to be conducted summer 2002.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- xx Building
- Site Boundary
- Background Feature
- Soil Boring
- Soil Gas Boring
- Nested Vapor Monitoring Well
- 5 Approximate Extent of TCE in Soil Gas >5 μg/L Prior to Remediation (25–45 ft. bgs)
Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study, SCOU Data Report.* Prepared for AFCEE, Brooks AFB, Texas. November.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

N

10 0 10 20 30 40 50
Scale in Feet
1:600

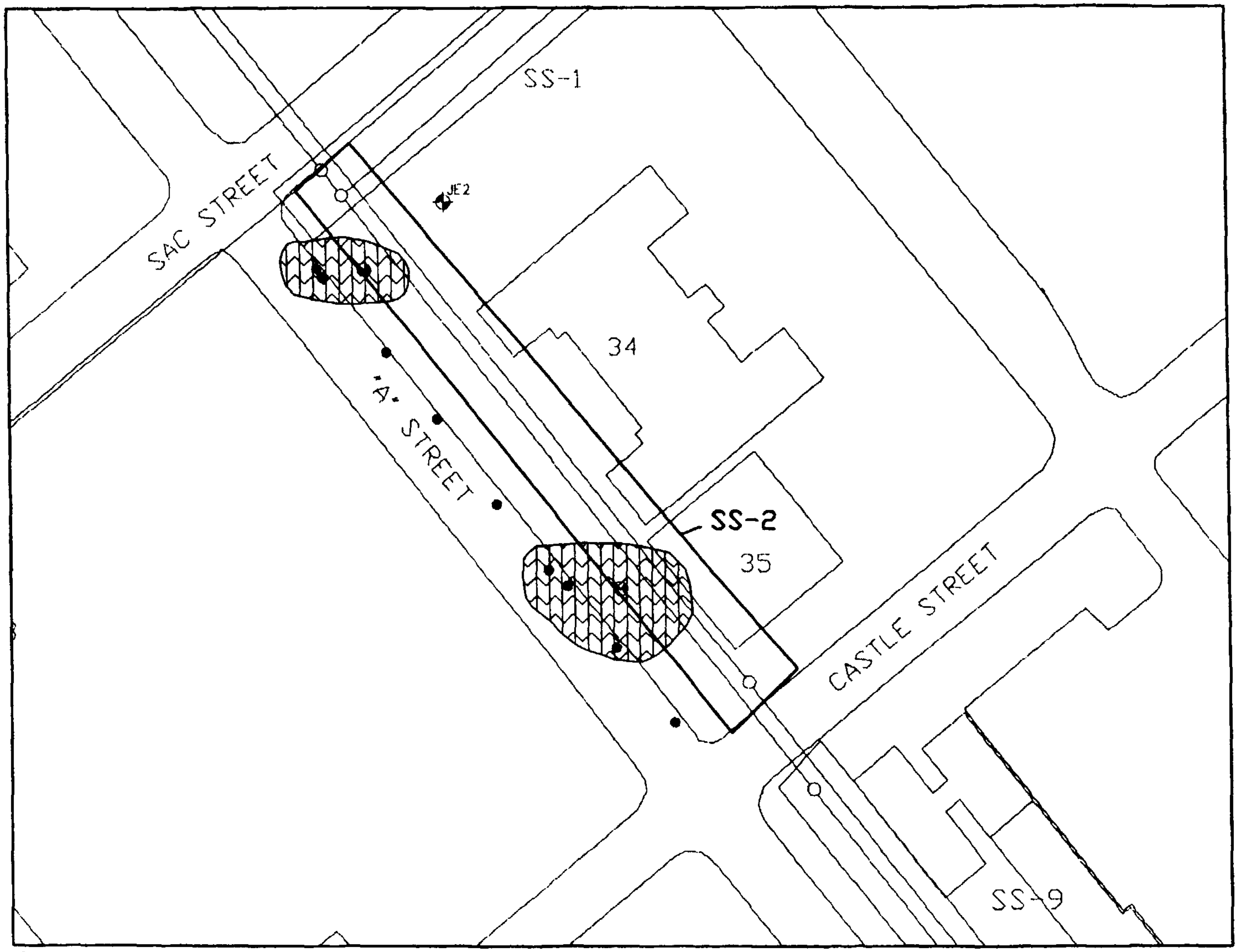
F-4 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 xv ..\cadd\05201001\cbpart2\cb2_basesite.dwg
6/28/02 xv

Job No. 05-2010-01

FIGURE E-8



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: SS-2 **GRID:** R10

LINKED SITES: None

DESCRIPTION: Sanitary sewer segment near the intersection of "A" and "SAC" Streets. The sewer system was installed in 1941 and initially received industrial wastes from sumps, floor drains, washracks and oil/water separators. The system currently handles only sanitary sewage. See Section 3.1.3.44.

CONTAMINANTS OF CONCERN	
SHHRA	WQSA
	TCE (<WQSA)

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.1E-07	0.003
GW:	5.7E-06	0.9
COMBINED:	5.8E-06	0.9

ECOLOGICAL HABITAT: None

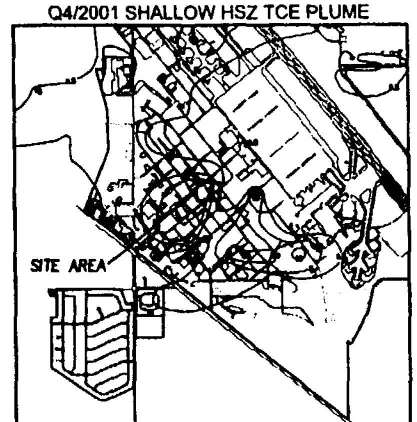
SELECTED REMEDY: SVE **SCOU ROD:** 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.1E-07	0.003
GW:	2.1E-06	0.06
COMBINED:	2.2E-06	0.06

DECISION PROCESS COMMENTS: SCOU FS preferred alternative was NFA. However, based on VOCs and petroleum hydrocarbons detected during data gap sampling, this was modified (post-FS decision) to SVE.

STATUS: Site evaluated as part of SVE Decision Study (Earth Tech, 2000). Vapor well installation and testing program scheduled for summer 2002.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- Building
- Site Boundary
- Background Feature
- Extraction Well
- Soil Boring
- Hand Auger
- Area of Apparent VOC and Petroleum Hydrocarbon Contamination in Soil (to 15 ft. bgs) and Soil Gas (to 60 ft bgs) Prior to Remediation

Source: Earth Tech. 2000. *Soil Vapor Extraction Decision Study SCOU Data Report*. Prepared for AFCEE, Brooks AFB, Texas. November.

Source: Jacobs, 1999. *SCOU Data Gap Investigation Report*. Prepared for AFCEE, Brooks AFB, Texas. August.

NOTE: Soil and Soil Gas Sampling Locations Shown are SCOU RI and SCOU Data Gap Investigation Only.

N

10 0 10 20 30 40 50
Scale In Feet
1:600

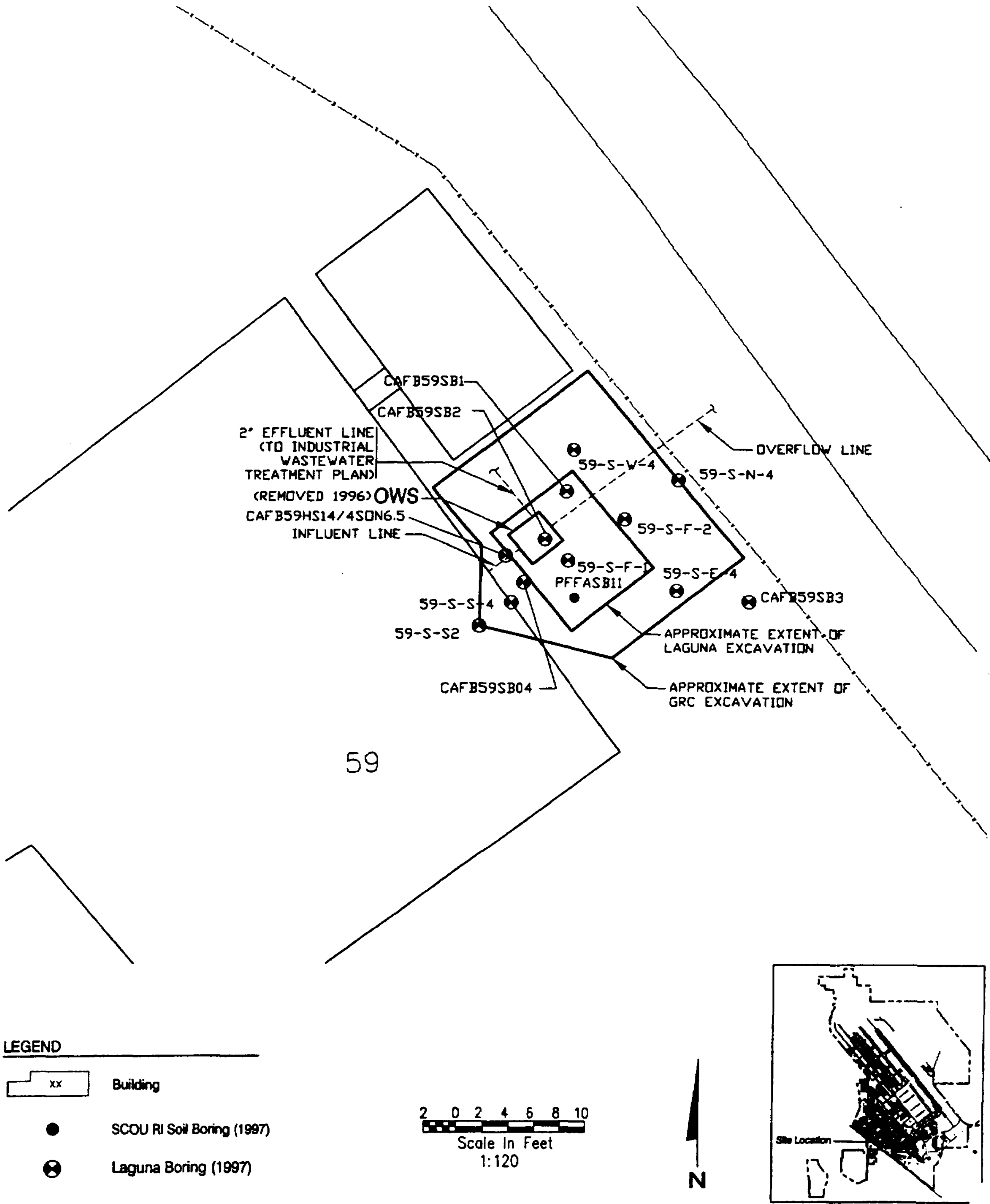
SS-2 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv
6/28/02 Xv
\cadd\05201001\cbpart2\ss2_baseside.dwg

Job No. 05-2010-01

FIGURE E-9

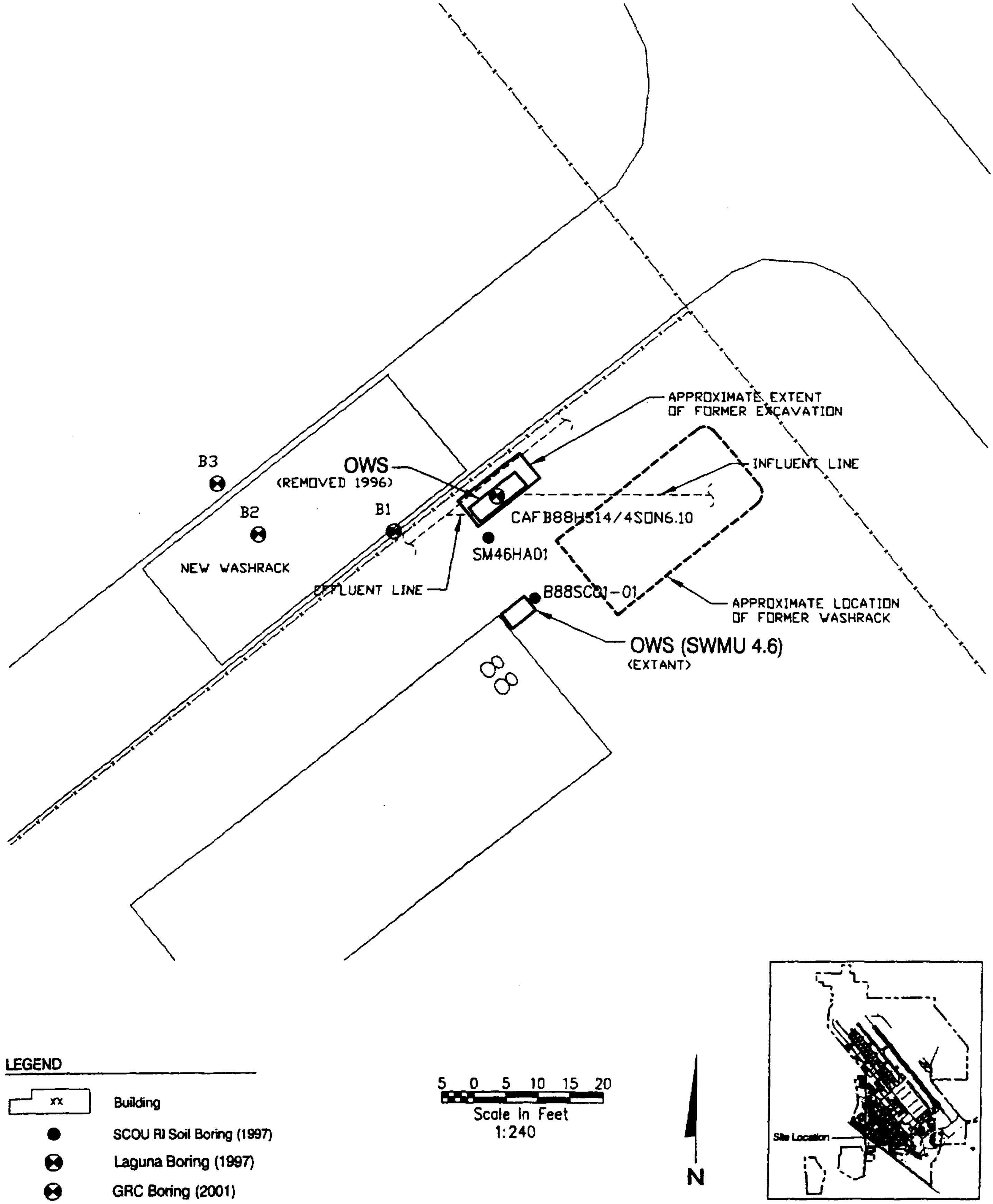


SWMU 4.4 Site Map

OWS/UST Site Investigation
Castle Airport

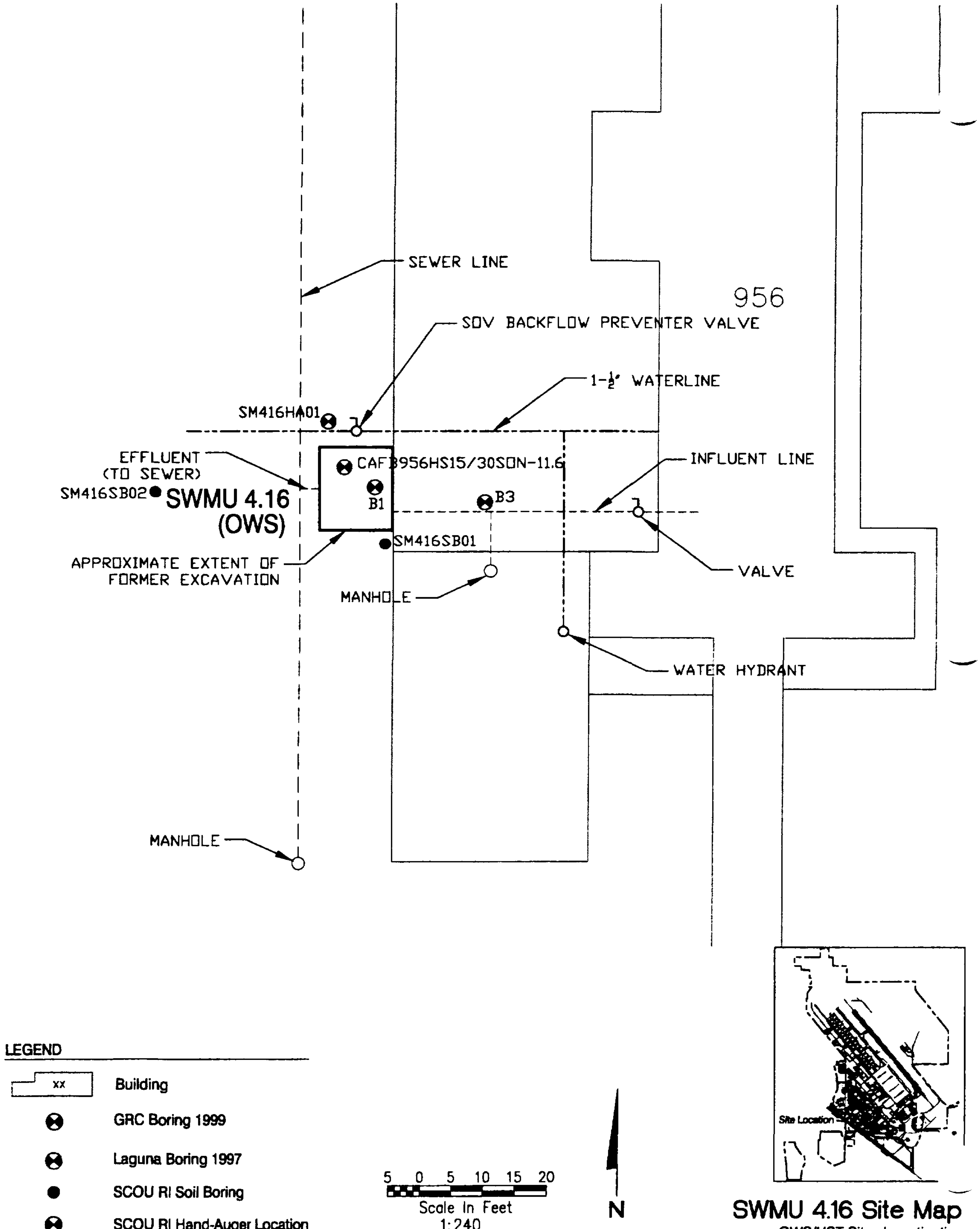
6/5/02 Xv ...\05Z01001\UST Site Invest\SWMU_1.dwg Job No. 05-Z010-01
10/16/02 Xv

FIGURE E-10

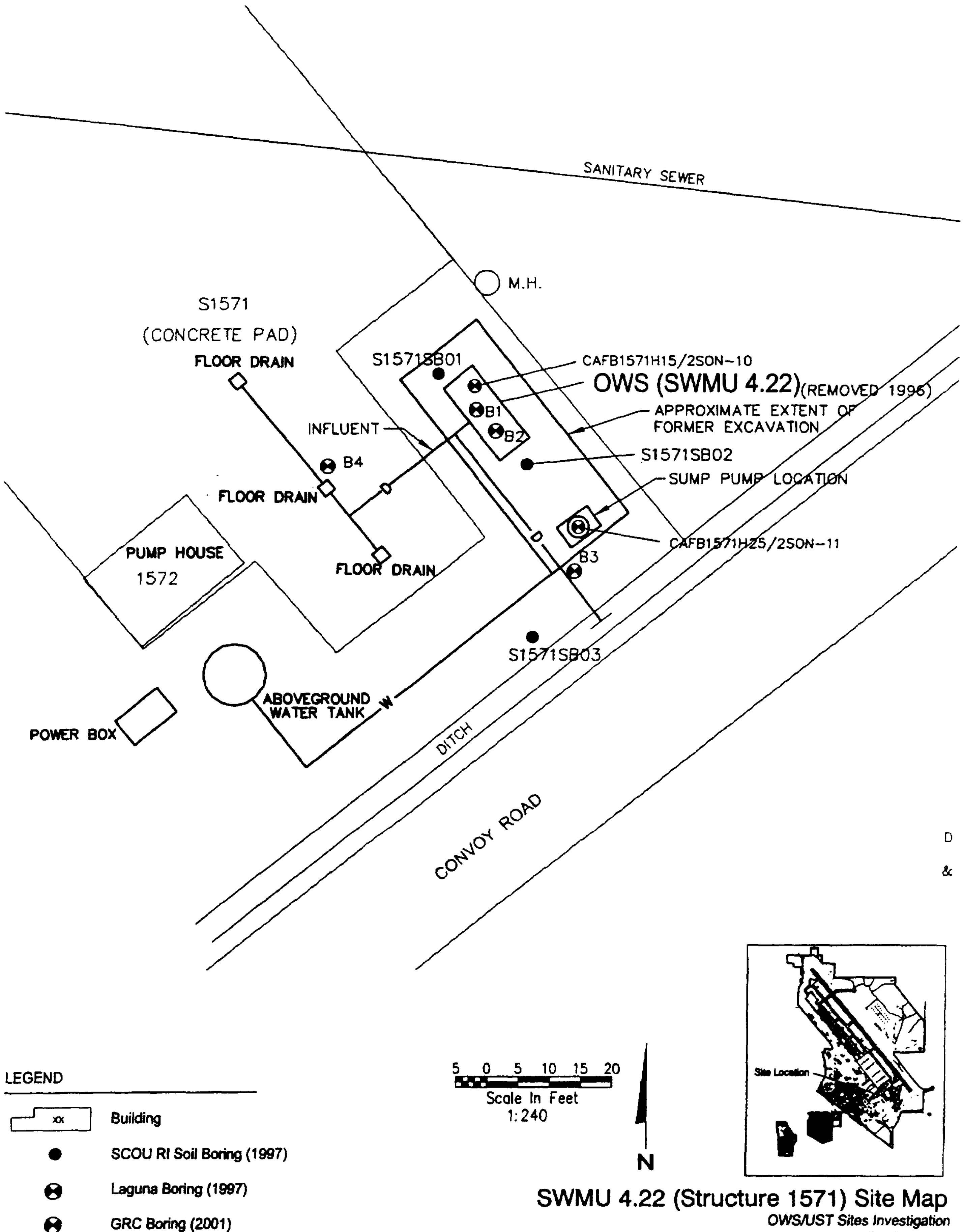


SWMU 4.6 Site Map

OWS/UST Site Investigation
Castle Airport

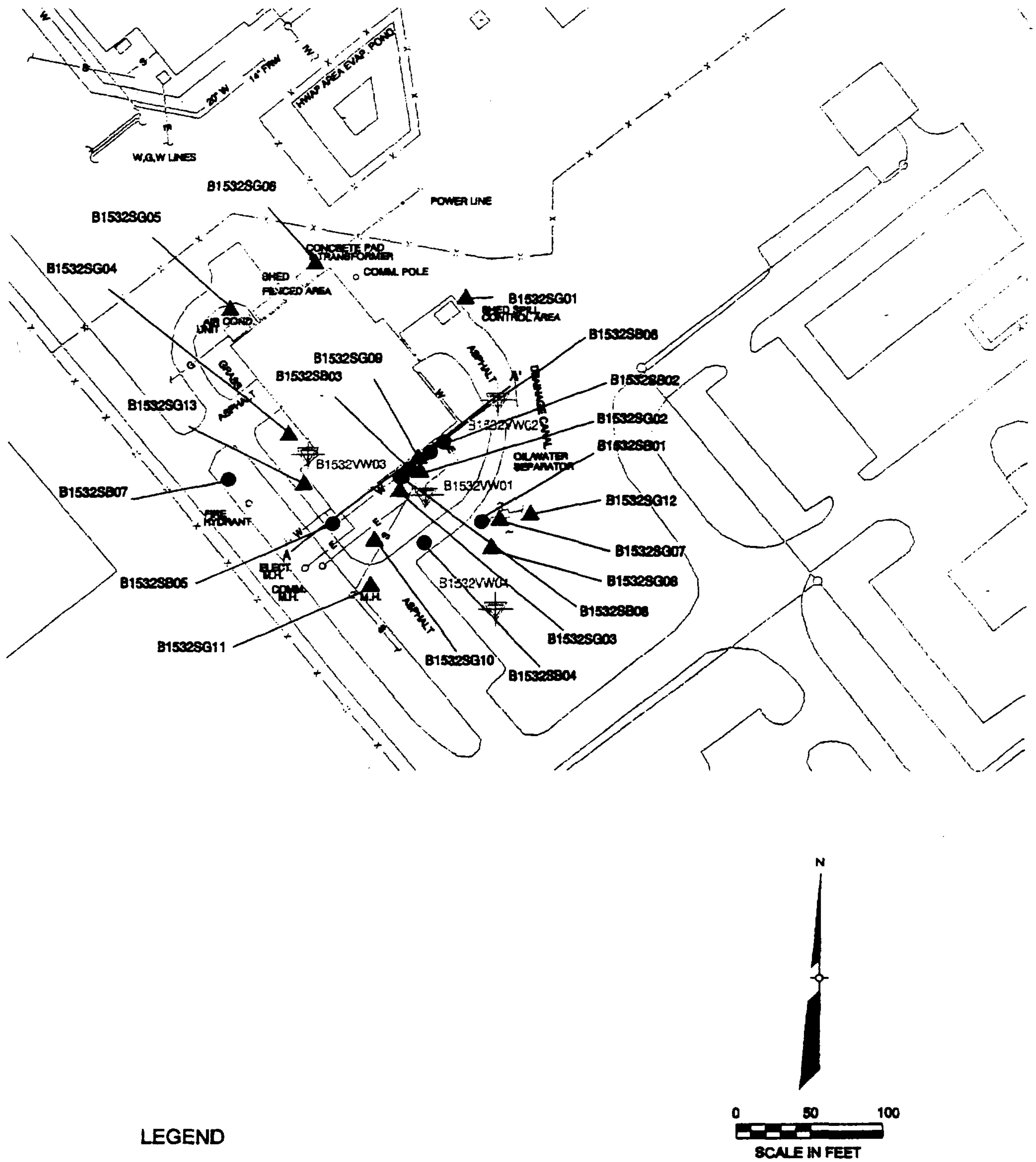


SWMU 4.16 Site Map
OWS/UST Sites Investigation
Castle Airport



SWMU 4.22 (Structure 1571) Site Map

OWS/UST Sites Investigation
Castle Airport

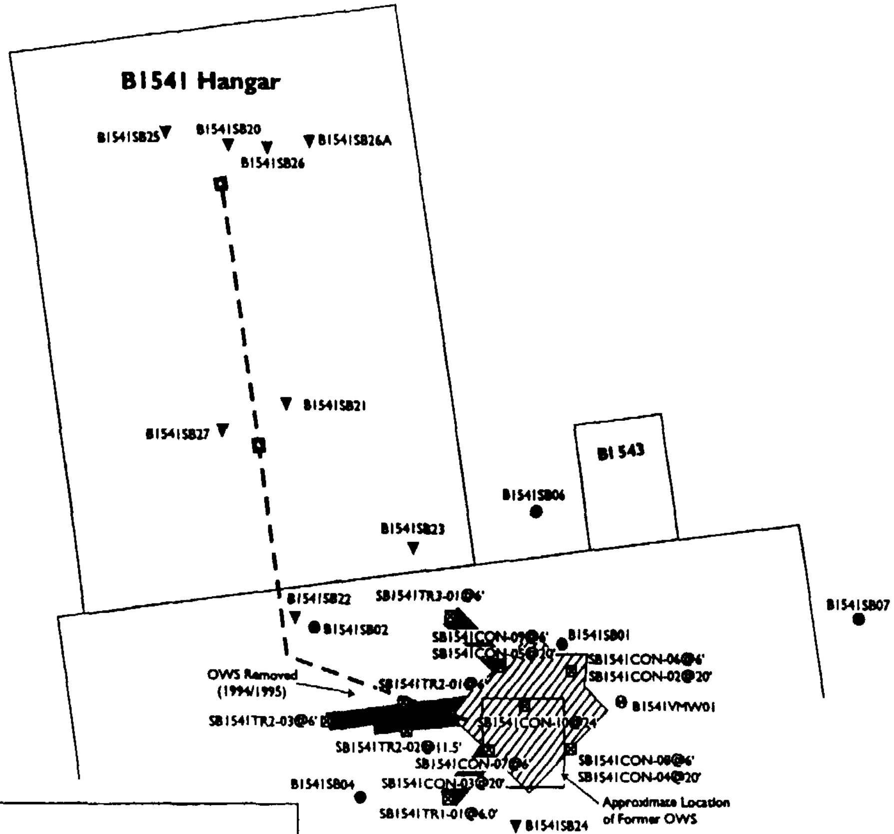


LEGEND

B1532SG10	▲	Previous Soil Gas Location
B1532SB03	●	Previous Soil Boring Location
B1532VW04		Vapor Well Location
A———A'		Cross-Section Location

Vapor Well Locations
Building 1532
Castle Airport

Date: 11-00 Project No. 37917	EARTH TECH A tyco INTERNATIONAL LTD. COMPANY	Figure E-14



LEGEND

- ● Soil Boring Location (Jacobs, 1996)
- Vapor Monitoring Well Location (Jacobs, 1996)
- Soil Sample Location (Montgomery Watson, 1999)
- ▼ 2001 Soil Boring Location
- Excavation Area July 1999 (15'x15'x23')
- Trench August 1999
- Catch Basin
- ..... Drain Line
- OWS Oil Water Seperator
- TVPH-g Total Volatile Petroleum Hydrocarbons as Gasoline
- TEPH-d Total Extractable Petroleum Hydrocarbons as Diesel
- RAO Remedial Action Objective

Notes: (1) Bolded values are above Castle RAOs
(2) Metals were not detected above RAOs

* Concentration detected in duplicate sample collected at this location.

2001 Supplemental Investigation

B1541SB20

Depth	TVPH-g	TEPH-d	Jet Fuel
1.5	**611J**	ND	578
5	**3.1J**	ND	63.8
11	0.028F	3.7F	ND
20	0.024F	ND	ND

B1541SB21

Depth	TVPH-g	TEPH-d	Jet Fuel
1.5	**1330J**	ND	1020
5	**109FJ**	ND	**1920**
13.5	0.049F	ND	ND

B1541SB22

Depth	TVPH-g	TEPH-d	Jet Fuel
5	0.031F	5F*	ND
12	0.031F	ND	ND
20	0.027F	3.5F	ND

B1541SB23

Depth	TVPH-g	TEPH-d	Jet Fuel
5	0.023F	3.0F	ND
11	0.019F	3.8F	ND

B1541SB24

Depth	TVPH-g	TEPH-d	Jet Fuel
5	8.9	ND	35.8

B1541SB25

Depth	TVPH-g	TEPH-d	Jet Fuel
5.5	ND	ND	0.93F

B1541SB26A

Depth	TVPH-g	TEPH-d	Jet Fuel
5.5	ND	ND	2.0F
11.5	ND	ND	ND

B1541SB27

Depth	TVPH-g	TEPH-d	Jet Fuel
2	ND	ND	**3040**
5	ND	ND	143
11	ND	ND	227

1999 Excavation and Trenching

SB1541CON-02

Depth	TVPH-g	TEPH-d
20	1.34	<10

SB1541CON-03

Depth	TVPH-g	TEPH-d
20	4.8	31

SB1541CON-04

Depth	TVPH-g	TEPH-d
20	0.96F	<10

SB1541CON-05

Depth	TVPH-g	TEPH-d
20	31	8.0J

SB1541CON-06

Depth	TVPH-g	TEPH-d
6	37	380

SB1541CON-07

Depth	TVPH-g	TEPH-d
6	**1900**	1400

SB1541CON-08

Depth	TVPH-g	TEPH-d
6	43	10

SB1541CON-09

Depth	TVPH-g	TEPH-d
6	**580**	**1600**

SB1541CON-10

Depth	TVPH-g	TEPH-d
24	<1	<10

SB1541TR1-01

Depth	TVPH-g	TEPH-d
6	10.4J	547

SB1541TR2-01

Depth	TVPH-g	TEPH-d
6.5	0.149J	<10

SB1541TR2-02

Depth	TVPH-g	TEPH-d
11.5	1.42	<10

SB1541TR2-03

Depth	TVPH-g	TEPH-d
6	0.680J	<10

SB1541TR3-01

Depth	TVPH-g	TEPH-d
6	46	**2055**

1993 SCOU Remedial Investigation

B1541SB01

Depth	TVPH-g	TEPH-d
7	ND	ND
20.5	ND	ND

B1541SB02

Depth	TVPH-g	TEPH-d
20.5	ND	ND

B1541SB04

Depth	TVPH-g	TEPH-d
9.5	1	ND
19.5	ND	ND
29	ND	ND
39	ND	ND
49	ND	ND

B1541SB06

Depth	TVPH-g	TEPH-d
9	ND	ND
19	ND	ND
29	ND	ND
36.5	ND	ND
49	ND	ND

0 7.5 15
SCALE IN FEET

MWH
MONTGOMERY WATSON HARZA

CASTLE AIRPORT
MERCED COUNTY, CALIFORNIA

BUILDING 1541 HANGAR AREA PREVIOUS INVESTIGATION RESULTS

FIGURE E-15

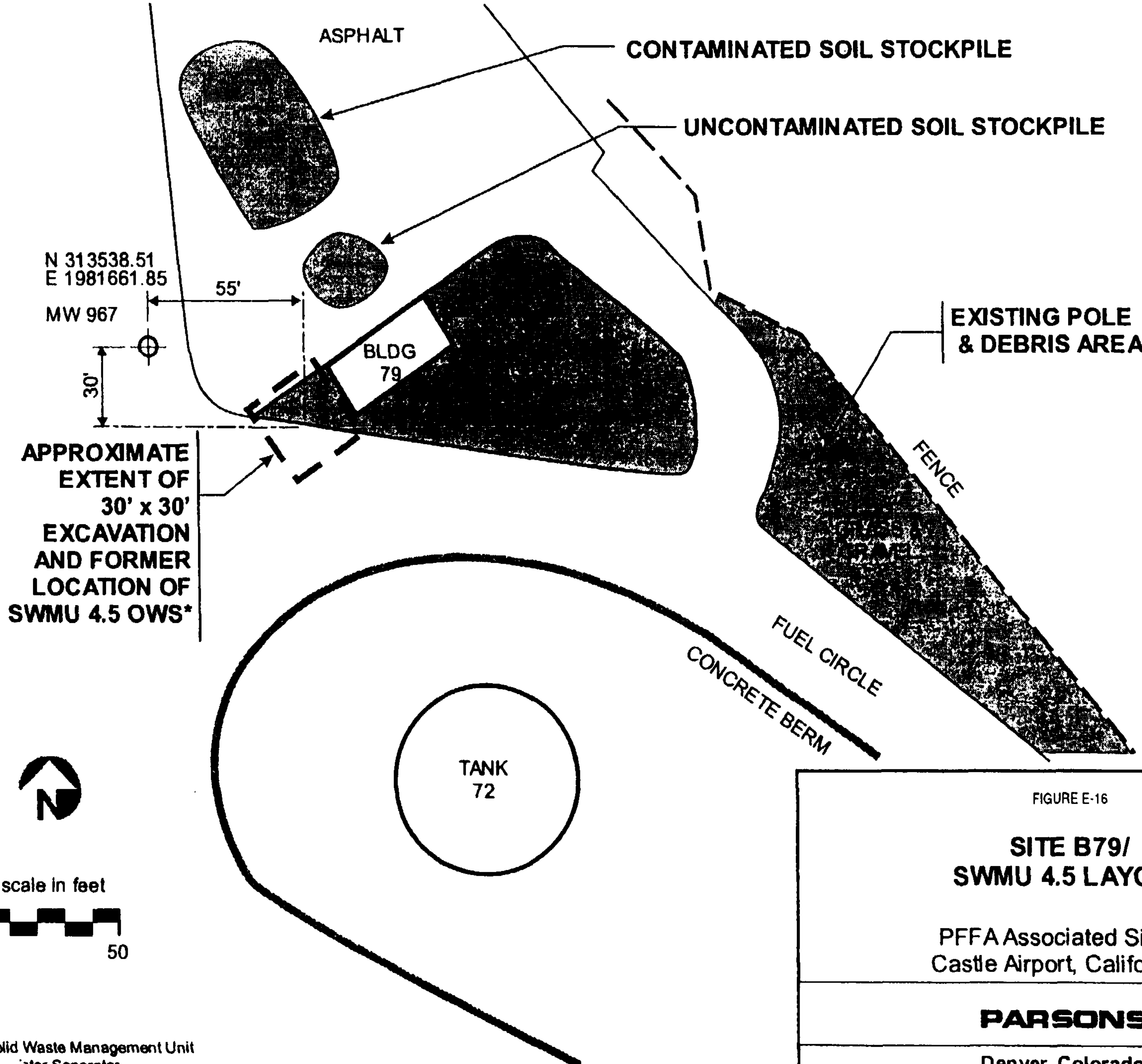


FIGURE E-16

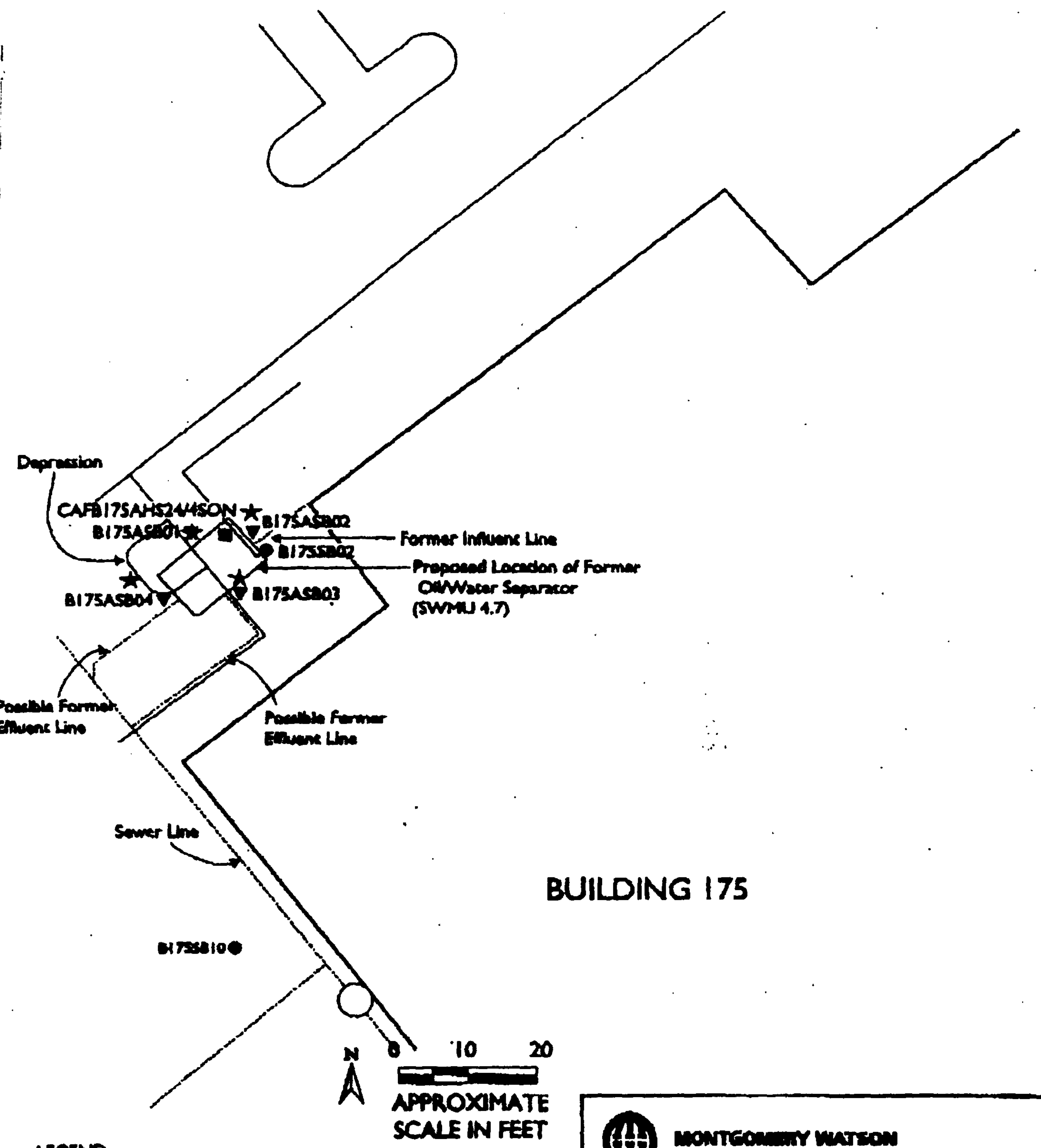
SITE B79/
SWMU 4.5 LAYOUT

PFFA Associated Sites
Castle Airport, California

PARSONS

Denver, Colorado

* SWMU = Solid Waste Management Unit
OWS = C ater Separator



LEGEND

●	Approximate Soil Boring Location (Jacobs, 1993)
■	Approximate Soil Sample Location (Laguna, 1996)
SWMU	Solid Waste Management Unit
▼	Proposed Soil Boring Location
★	Approximate Soil Boring Location

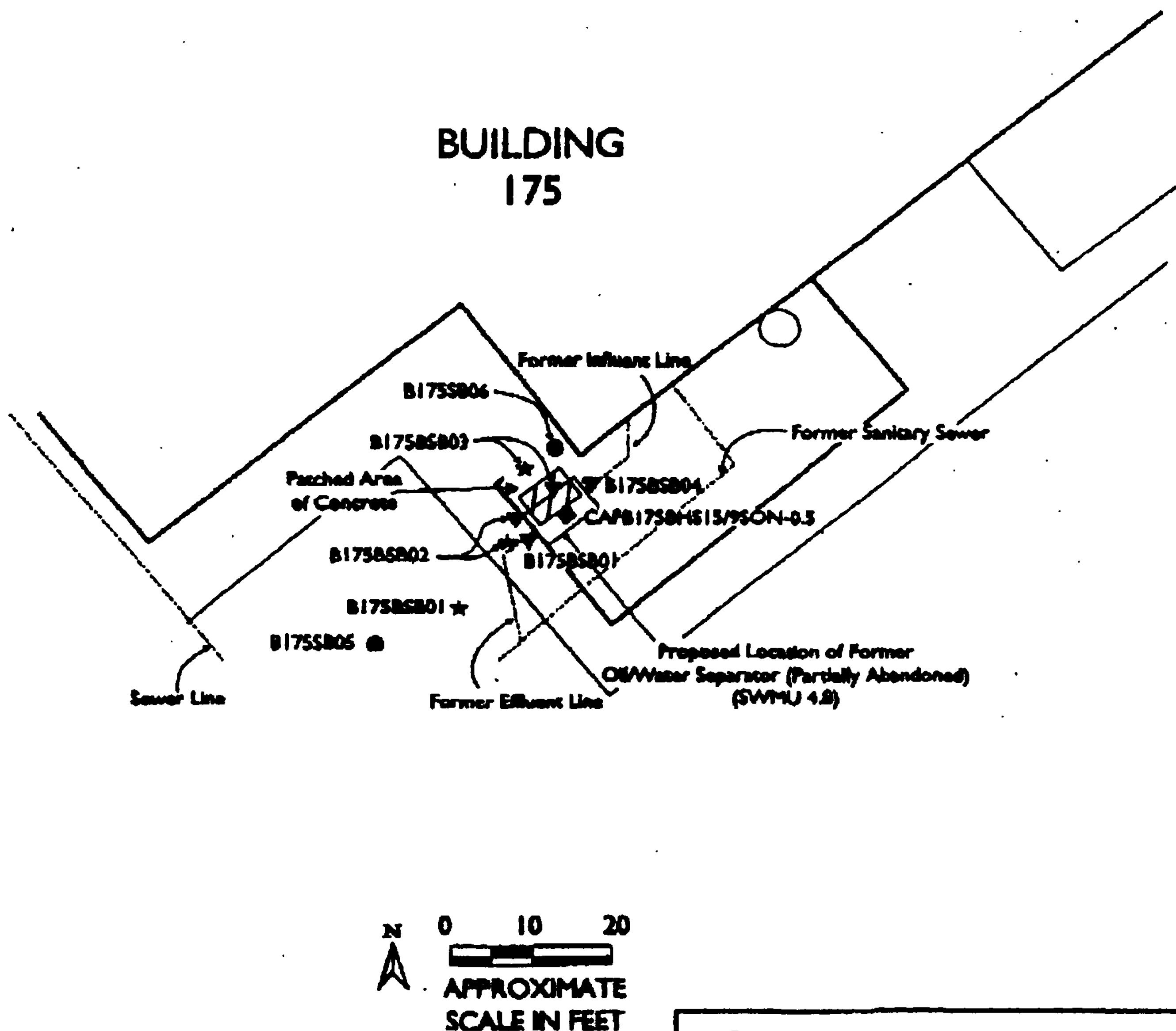
Sources: Jacobs (1996a), Laguna (1996)

MONTGOMERY WATSON

CASTLE AIRPORT
MERCED COUNTY, CALIFORNIA
SOURCE CONTROL OPERABLE UNIT

BUILDING 175 (SWMU 4.7)
SITE FEATURES AND SAMPLING LOCATIONS

FIGURE E-17



LEGEND

- ● Approximate Soil Boring Location (Jacobs, 1993)
- ■ Approximate Soil Sample Location (Laguna, 1996)
- SWMU Solid Waste Management Unit
- ▼ Proposed Soil Boring Location
- ★ Approximate Soil Boring Location
- Note: B175SB01 is an angle boring

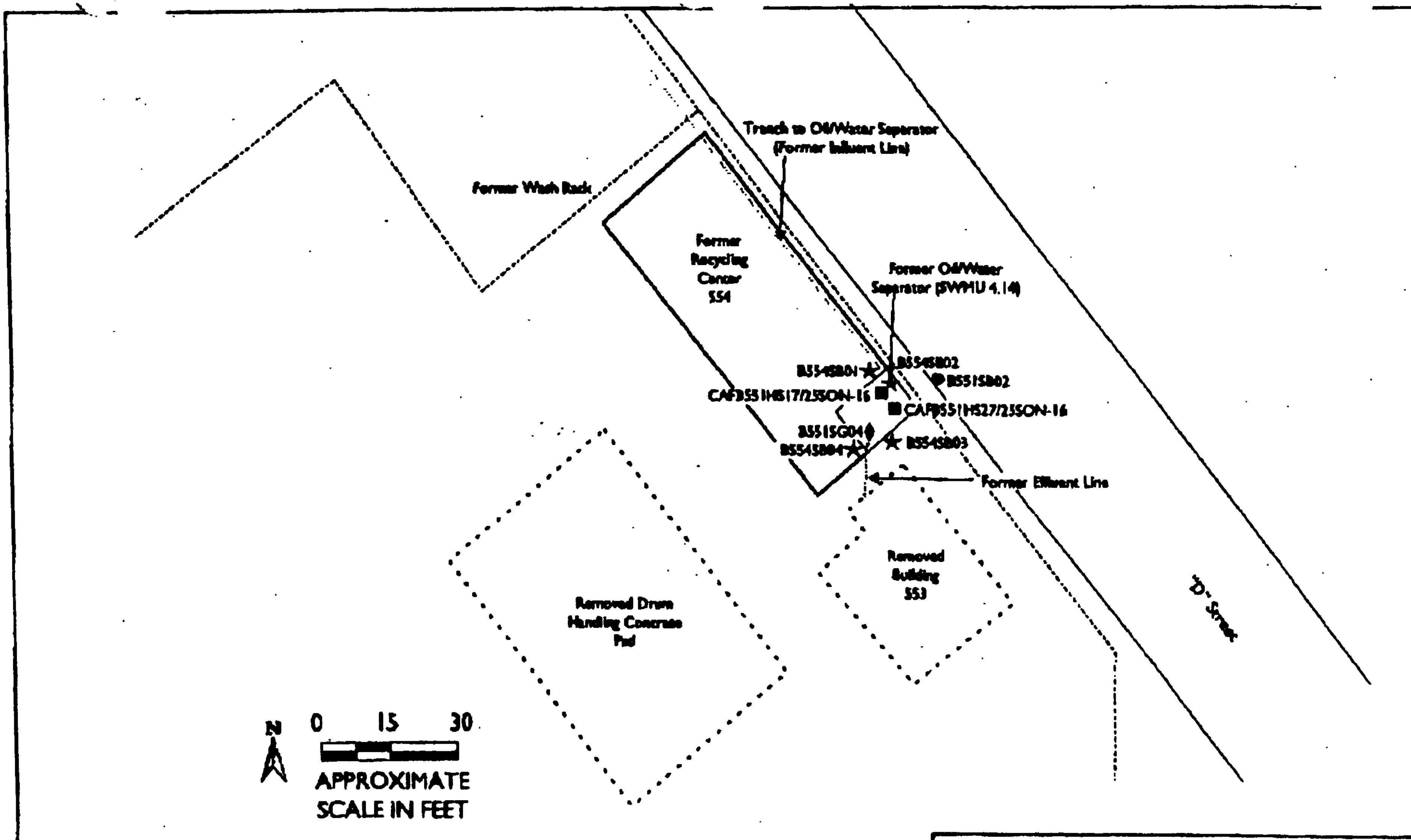
Sources: Jacobs (1996a), Laguna (1996)

MONTGOMERY WATSON

CASTLE AIRPORT
MERCED COUNTY, CALIFORNIA
SOURCE CONTROL OPERABLE UNIT

BUILDING 175 (SWMU 4.8)
SAMPLE AND BORING LOCATIONS

FIGURE E-18



LEGEND

●	Approximate Soil Boring Location (Jacobs, 1993)
■	Approximate Soil Sample Location (Laguna, 1996)
SWMU	Solid Waste Management Unit
♦	Approximate Soil Gas Sample Location (Jacobs, 1993)
★	Approximate Soil Boring Location
------	Fence Line

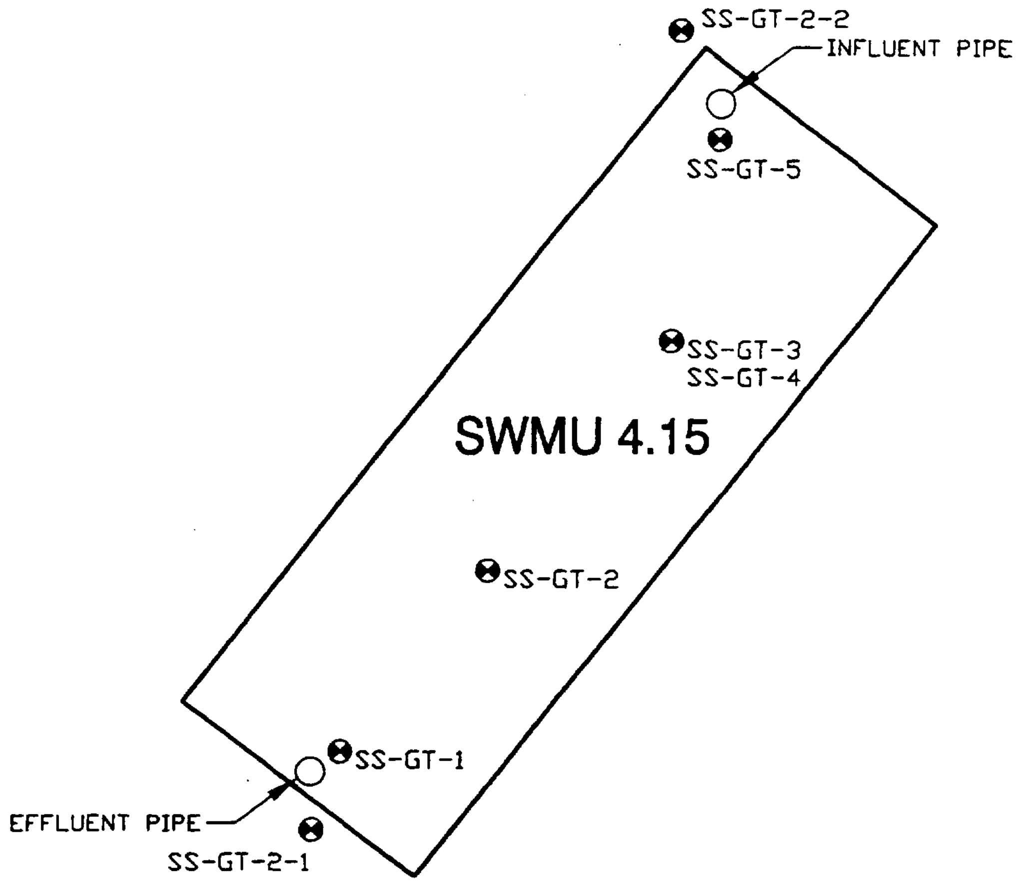
Sources: Jacobs (1996a), Laguna (1996)

MONTGOMERY WATSON

CASTLE AIRPORT
MERCED COUNTY, CALIFORNIA
SOURCE CONTROL OPERABLE UNIT

BUILDING 551 (SWMU 4.14)
SITE FEATURES AND SAMPLING LOCATIONS

FIGURE E-19

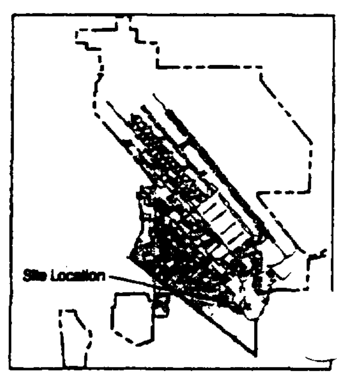


LEGEND

GRC Soil Sampling Location (1999)

1 0 1 2
Scale In Feet
1:24

N

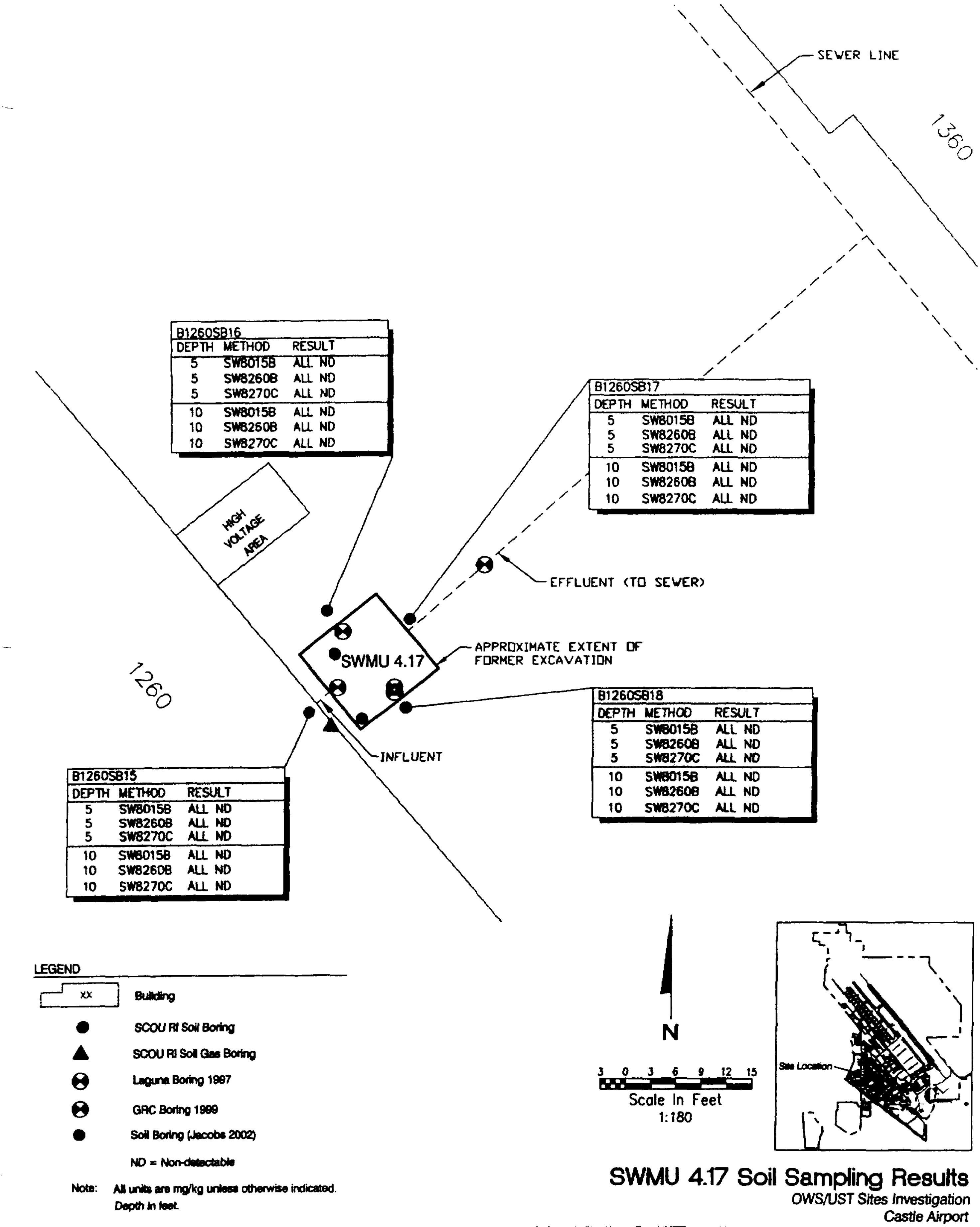


SWMU 4.15 Sample Locations

OWS/UST Site Investigation
Castle Airport

6/5/02 Xv
12/11/02 Xv
...\05201001\UST Site Invest\SWMU_4.15_2.dwg Job No. 05-2010-01

FIGURE E-20

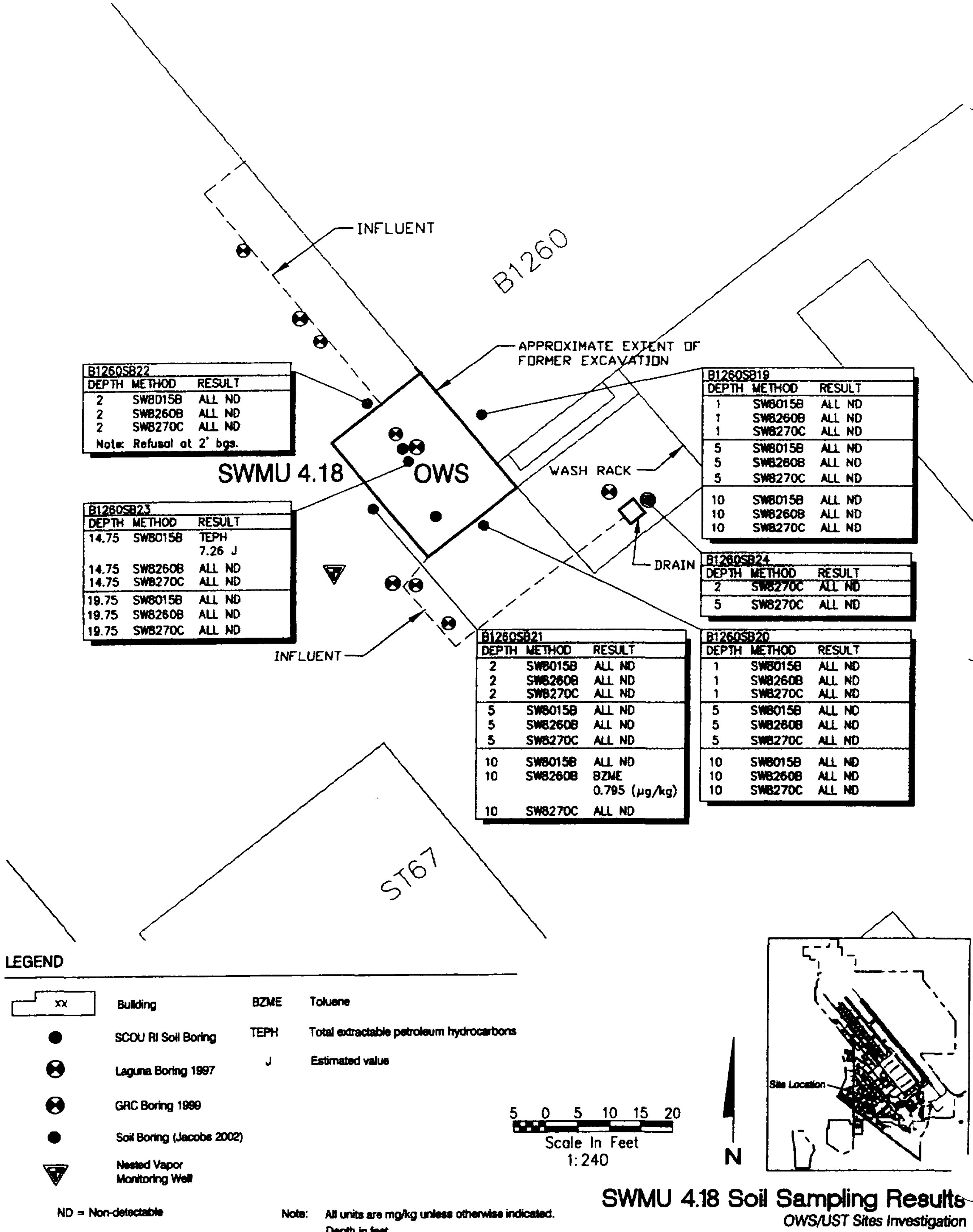


SWMU 4.17 Soil Sampling Results

OWS/UST Sites Investigation
Castle Airport

6/5/02 Xv ...\05Z01001\UST Site Invest\SWMU_RESULT.dwg Job No. 05-Z010-01
12/9/02 Xv

FIGURE E-21

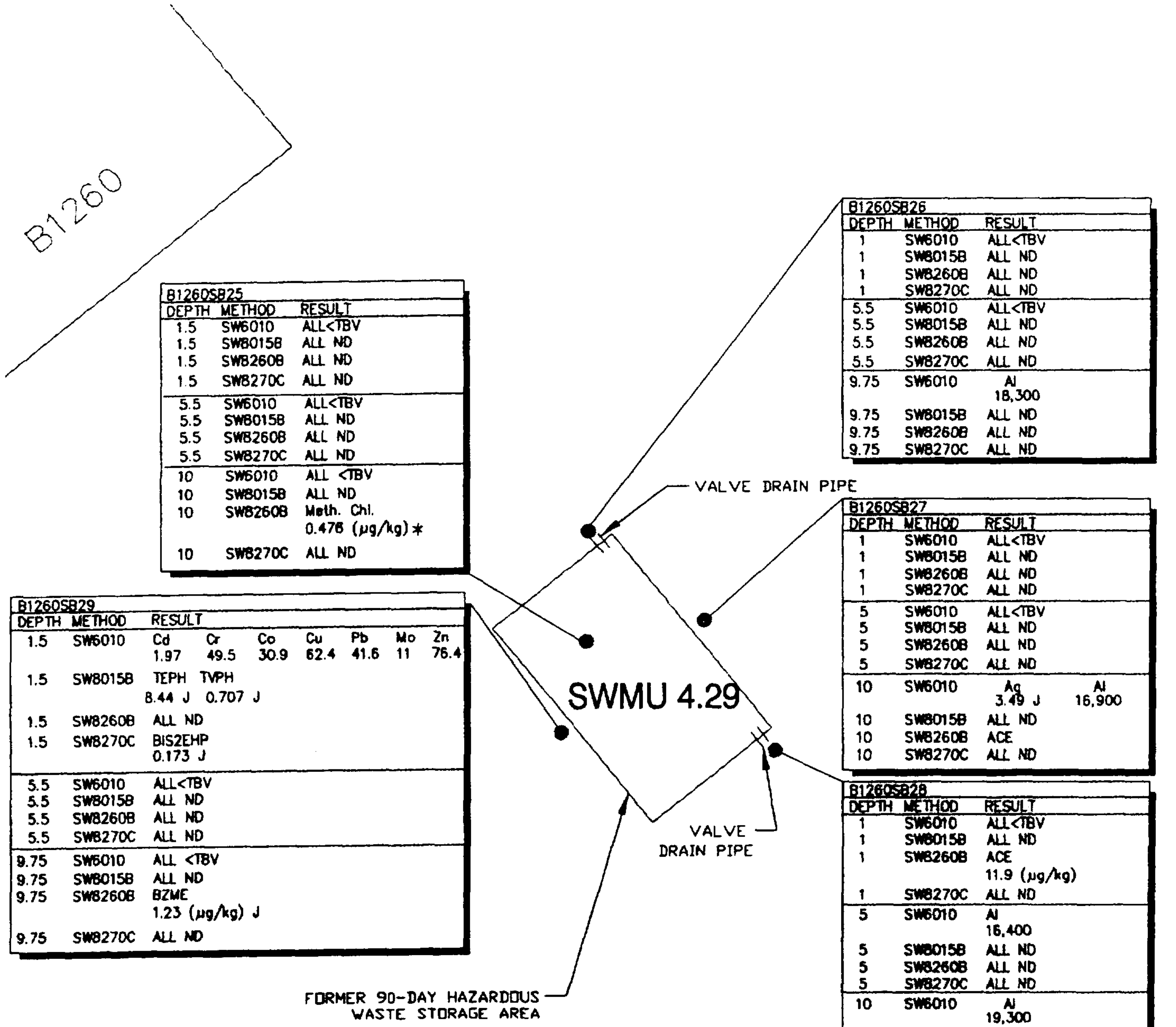


SWMU 4.18 Soil Sampling Results

OWS/UST Sites Investigation
Castle Airport

6/5/02 Xv
12/9/02 Xv
...\05Z01001\UST Site Invest\SWMU_Result.dwg Job No. 05-Z010-01

FIGURE E-22



B1260SB25

DEPTH	METHOD	RESULT
1.5	SW6010	ALL<TBV
1.5	SW8015B	ALL ND
1.5	SW8260B	ALL ND
1.5	SW8270C	ALL ND
5.5	SW6010	ALL<TBV
5.5	SW8015B	ALL ND
5.5	SW8260B	ALL ND
5.5	SW8270C	ALL ND
10	SW6010	ALL <TBV
10	SW8015B	ALL ND
10	SW8260B	Meth. Chl. 0.476 (μg/kg) ✱
10	SW8270C	ALL ND

B1260SB29

DEPTH	METHOD	RESULT						
1.5	SW6010	Cd 1.97	Cr 49.5	Co 30.9	Cu 62.4	Pb 41.6	Mo 11	Zn 76.4
1.5	SW8015B	TEPH 8.44 J	TVPH 0.707 J					
1.5	SW8260B	ALL ND						
1.5	SW8270C	BIS2EHP 0.173 J						
5.5	SW6010	ALL<TBV						
5.5	SW8015B	ALL ND						
5.5	SW8260B	ALL ND						
5.5	SW8270C	ALL ND						
9.75	SW6010	ALL <TBV						
9.75	SW8015B	ALL ND						
9.75	SW8260B	BZME 1.23 (μg/kg) J						
9.75	SW8270C	ALL ND						

B1260SB26

DEPTH	METHOD	RESULT
1	SW6010	ALL<TBV
1	SW8015B	ALL ND
1	SW8260B	ALL ND
1	SW8270C	ALL ND
5.5	SW6010	ALL<TBV
5.5	SW8015B	ALL ND
5.5	SW8260B	ALL ND
5.5	SW8270C	ALL ND
9.75	SW6010	Al 18,300
9.75	SW8015B	ALL ND
9.75	SW8260B	ALL ND
9.75	SW8270C	ALL ND

B1260SB27

DEPTH	METHOD	RESULT	
1	SW6010	ALL<TBV	
1	SW8015B	ALL ND	
1	SW8260B	ALL ND	
1	SW8270C	ALL ND	
5	SW6010	ALL<TBV	
5	SW8015B	ALL ND	
5	SW8260B	ALL ND	
5	SW8270C	ALL ND	
10	SW6010	Ag 3.49 J	Al 16,900
10	SW8015B	ALL ND	
10	SW8260B	ACE	
10	SW8270C	ALL ND	

B1260SB28

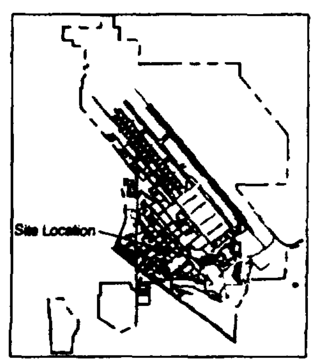
DEPTH	METHOD	RESULT
1	SW6010	ALL<TBV
1	SW8015B	ALL ND
1	SW8260B	ACE 11.9 (μg/kg)
1	SW8270C	ALL ND
5	SW6010	Al 16,400
5	SW8015B	ALL ND
5	SW8260B	ALL ND
5	SW8270C	ALL ND
10	SW6010	Al 19,300
10	SW8015B	ALL ND
10	SW8260B	ALL ND
10	SW8270C	ALL ND

LEGEND

XX	Building
●	Soil Boring (Jacobs 2002)
BIS2EHP	Bis (2-ethylhexy1) phthalate
BZME	Toluene
TEPH	Total extractable petroleum hydrocarbons
TVPH	Total volatile petroleum hydrocarbons
Meth. Chl.	Methylene chloride
ND = Non-detectable	
TBV = Threshold background value	
✱	Filed Duplicate Was ND

ACE	Acetone
Al	Aluminum
Ag	Silver
Cd	Cadmium
Cr	Chromium
Co	Cobalt
Cu	Copper
Mo	Molybdenum
Pb	Lead
Sb	Antimony
Zn	Zinc
J	Estimated value

Note: All units are mg/kg unless otherwise indicated.
Depth in feet.

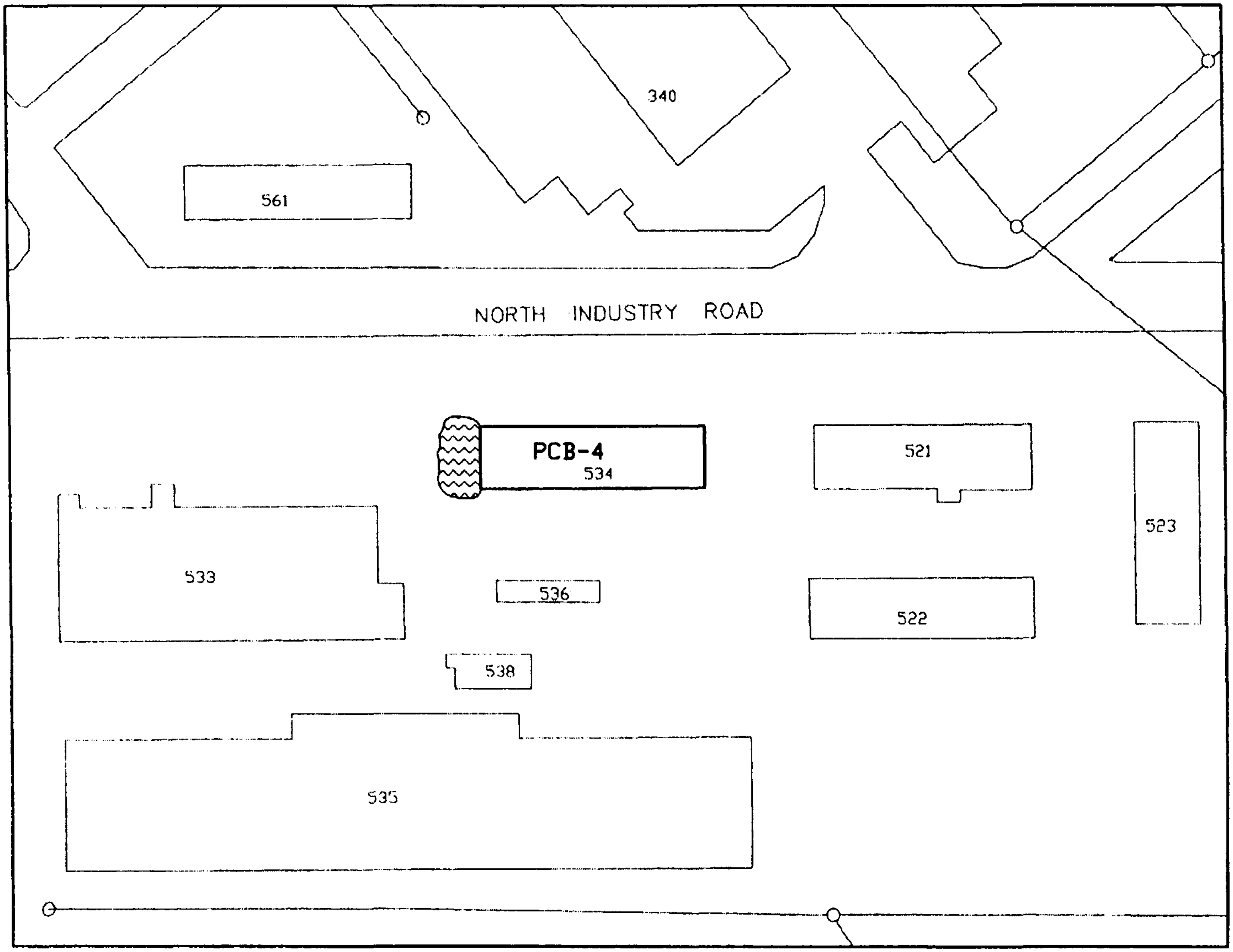


SWMU 4.29 Soil Sampling Results

OWS/UST Sites Investigation
Castle Airport

6/5/02 Xv
12/9/02 Xv
...\05Z01001\UST Site Invest\SWMU_Result.dwg Job No. 05-Z010-01

FIGURE E-23



LEGEND

Building
Site Boundary
Background Feature
Approximate Location of Surface Spill of Transformer Oil Containing PCBs.

Source: Jacobs, 1997. *Final Castle Airport–SCOU RI/FS.* Prepared for AFCEE, Brooks AFB, Texas. May.

10 0 10 20 30 40 50
Scale in Feet
1:600

N

REMEDIAL RESPONSE PROCESS SUMMARY

SITE: PCB-4 **GRID:** S11
LINKED SITES: None
DESCRIPTION: PCB spill area adjacent to B534. In 1979/1980, transformer oil containing PCBs leaked onto a platform and surrounding soil. A cleanup occurred soon after the spill during which an unknown volume but less than 20 cubic yards of contaminated soil was excavated and disposed offsite. See Section 3.1.3.37.

CONTAMINANTS OF CONCERN	
SHHRA	WQSA

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.4E-06	0
GW:	4.2E-06	7.8
COMBINED:	1.8E-05	7.8

ECOLOGICAL HABITAT: None

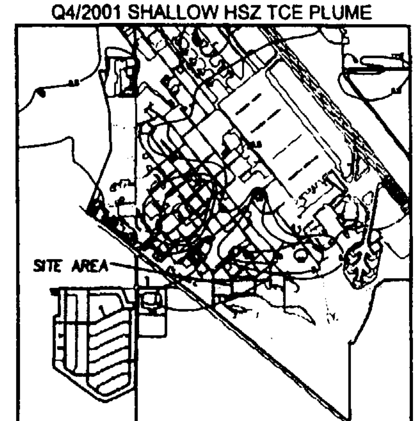
SELECTED REMEDY: To be determined — **CB ROD:** Part 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.4E-05	0
GW:	4.0E-10	0
COMBINED:	1.4E-05	0

DECISION PROCESS COMMENTS: Risk management NFA decision (SCOU ROD 1) currently being reevaluated based on a revised federal cleanup level for PCBs of 10 mg/kg. RAO for SCOU ROD 1 decisions was 25 mg/kg. The maximum PCB concentration in three samples collected after the original spill cleanup (pre-RI) was 5 mg/kg).

STATUS: Additional characterization planned in response to regulatory agency comments on SCOU ROD Part 1. Possible excavation and disposal during summer 2002. Cancer risk and hazard index values will be revised.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

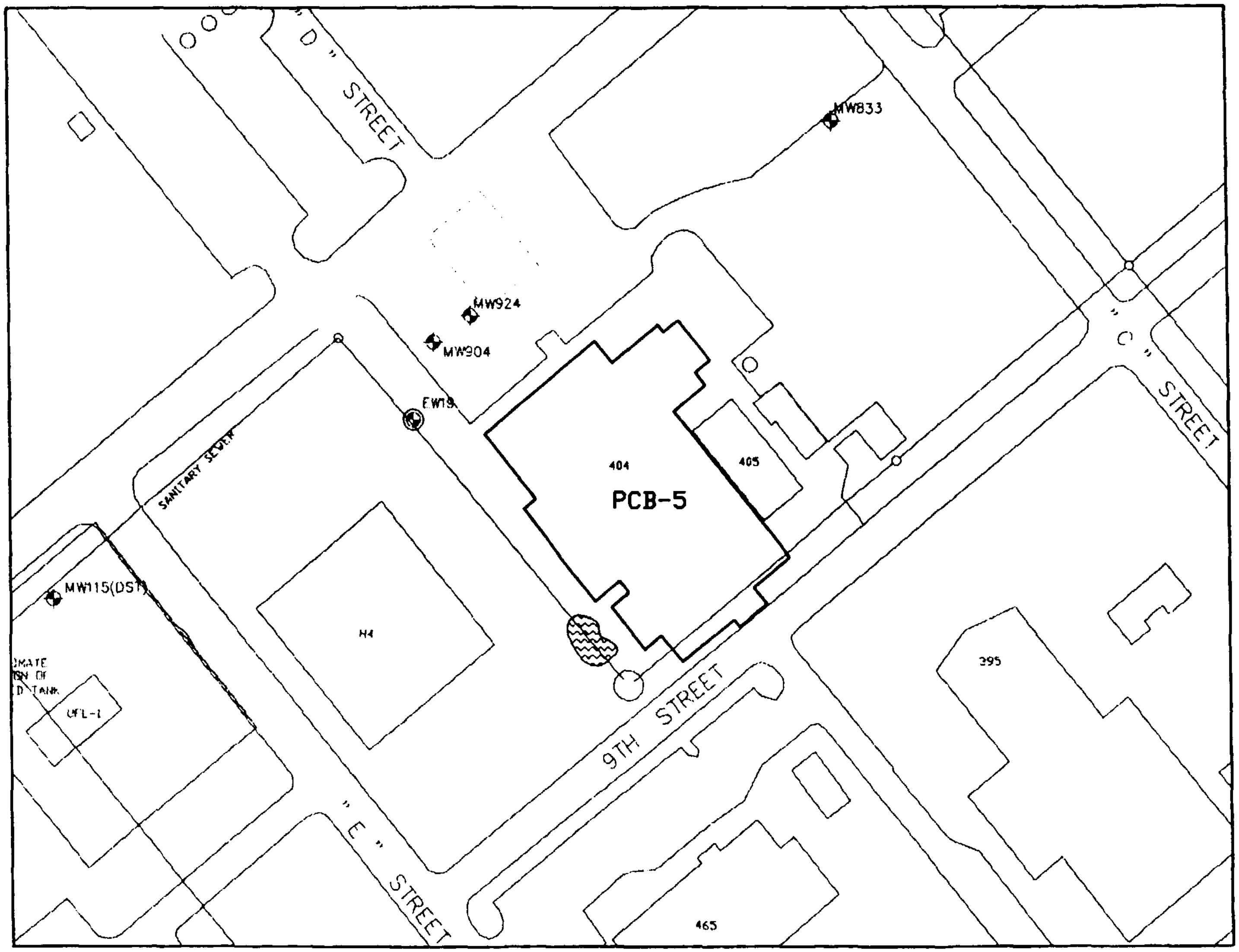
PCB 4 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 XV ..\cadd\05201001\cbpart2\cb2_basewide.dwg
6/28/02 XV

Job No. 05-2010-01

FIGURE E-24



LEGEND

- Building
- Site Boundary
- Background Feature
- Extraction Well
- Monitoring Well
- Approximate Location of Surface Spill of Transformer Oil Containing PCBs.

Source: Jacobs, 1997. *Final Castle Airport–SCOU RI/FS.* Prepared for AFCEE, Brooks AFB, Texas. May.

14 0 70
Scale In Feet
1:840

N

REMEDIAL RESPONSE PROCESS SUMMARY

SITE: PCB-5 **GRID:** R10
LINKED SITES: None
DESCRIPTION: PCB spill area adjacent to B404. In 1979/1980, transformer oil containing PCBs leaked onto soil surrounding a concrete pad. A cleanup occurred soon after the spill during which an unknown volume, but assumed to be less than 20 cubic yards of contaminated soil was excavated and disposed offsite. See Section 3.1.3.38.

CONTAMINANTS OF CONCERN	
BHHRA	WQSA

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	8.6E-06	0
GW:	4.7E-05	3.9
COMBINED:	5.6E-05	3.9

ECOLOGICAL HABITAT: None

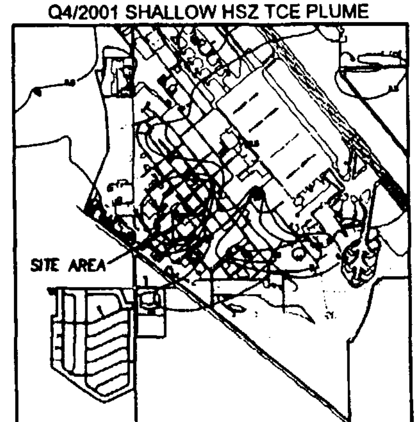
SELECTED REMEDY: To be determined — **CB ROD:** Part 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	8.6E-06	0
GW:	8.0E-06	0.2
COMBINED:	1.7E-05	0.2

DECISION PROCESS COMMENTS: Risk management NFA decision (SCOU ROD 1) currently being reevaluated based on a revised federal cleanup level for PCBs of 10 mg/kg. RAO for SCOU ROD 1 decisions was 25 mg/kg. The maximum PCB concentration in 15 samples collected after the original spill cleanup (pre-RI) was 14 mg/kg).

STATUS: Additional characterization planned in response to regulatory agency comments on SCOU ROD Part 1. Possible excavation and disposal during summer 2002. Cancer risk and hazard index values will br revised.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

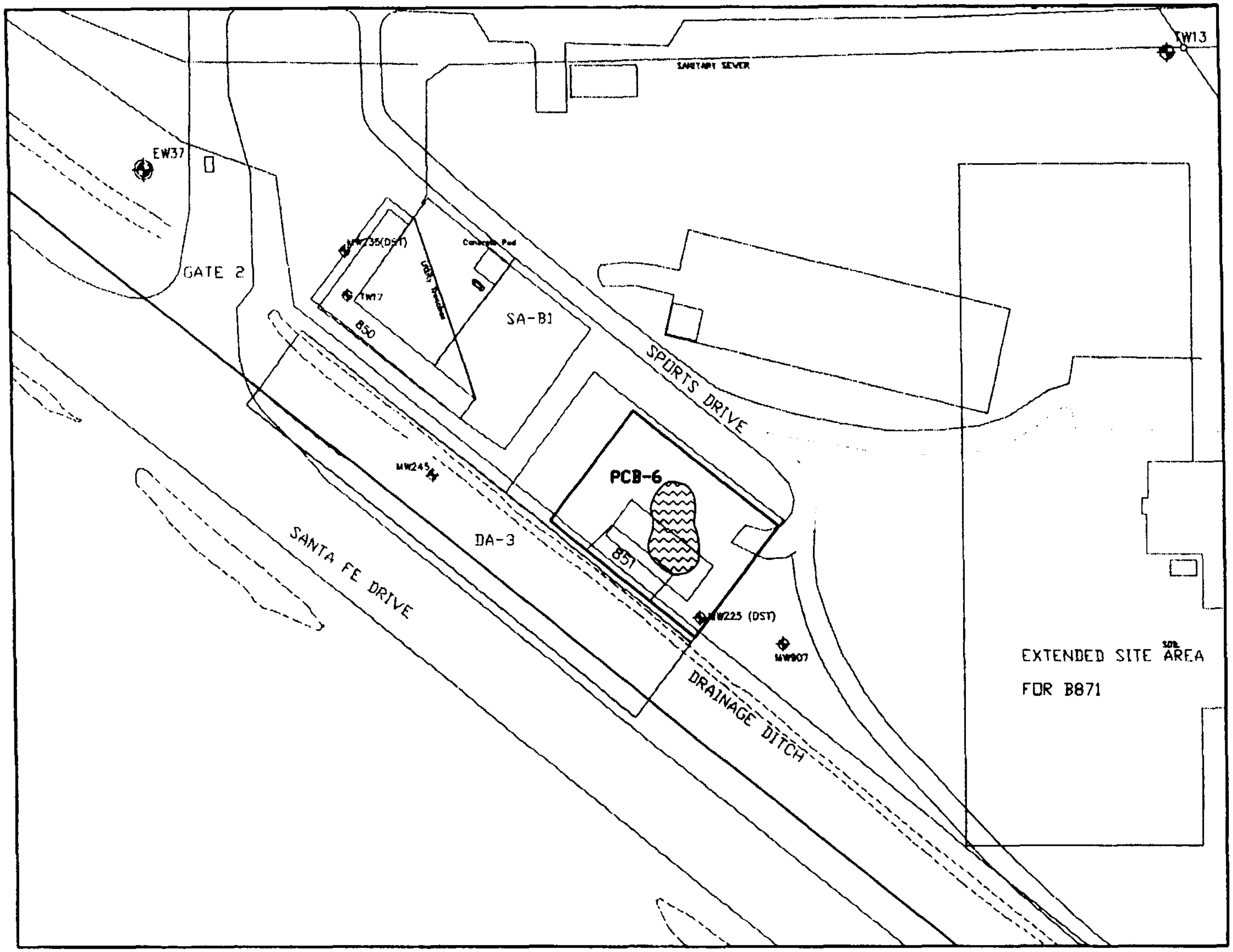
PCB 5 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv
6/28/02 Xv
..\cadd\05201001\cbpart2\cb2_basewide.dwg

Job No. 05-2010-01

FIGURE E-25



REMEDIAL RESPONSE PROCESS SUMMARY

SITE: PCB-6 **GRID:** T11

LINKED SITES: None

DESCRIPTION: PCB spill area adjacent to B851. In 1982, oil containing PCBs leaked from a truck mounted transformer onto an area of mixed asphalt and bare soil. The nature or extent of any spill cleanup is unknown. See Section 3.1.3.39.

CONTAMINANTS OF CONCERN	
BHHRA	WQSA

PRE-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.2E-05	0
GW:	3.8E-06	1.2
COMBINED:	1.6E-05	1.2

ECOLOGICAL HABITAT: None

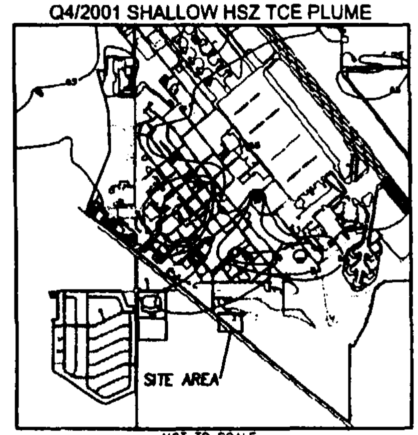
SELECTED REMEDY: To be determined — **CB ROD:** Part 2

POST-REMEDY HH:	CANCER RISK	NON-CANCER HAZARD
SOIL:	1.2E-06	0
GW:	4.0E-10	0
COMBINED:	1.2E-06	0

DECISION PROCESS COMMENTS: Risk management NFA decision (SCOU ROD 1) currently being reevaluated based on a revised federal cleanup level for PCBs of 10 mg/kg. RAO for SCOU ROD 1 decisions was 25 mg/kg. The maximum PCB concentration in three samples collected after the original spill (pre-RI) was 9 mg/kg.

STATUS: Additional characterization planned in response to regulatory agency comments on SCOU ROD Part 1. Possible excavation and disposal during summer 2002. Cancer risk and hazard index values will be revised.

SITE LOCATION WITH RESPECT TO THE Q4/2001 SHALLOW HSZ TCE PLUME



NOT TO SCALE

LEGEND

- Building
- Site Boundary
- Background Feature
- Extraction Well
- Monitoring Well
- Approximate Location of Surface Spill of Transformer Oil Containing PCBs.

Source: Jacobs, 1997. *Final Castle Airport-SCOU RI/FS.* Prepared for AFCEE, Brooks AFB, Texas. May.

20 0 20 40 60 80 100
Scale In Feet
1:1200

N

PCB 6 Site Area Map

CB RI/FS Part 2
Castle Airport

4/17/01 Xv ..\cadd\05201001\cbpart2\cb2_baseside.dwg
6/28/02 Xv

Job No. 05-2010-01

FIGURE E-26

APPENDIX F

REPORTER'S TRANSCRIPT, REVISED PROPOSED PLAN PUBLIC HEARING

SOURCE CONTROL OPERABLE UNIT

REVISED PROPOSED PLAN

PUBLIC HEARING

--o0o--

Atwater, California

Wednesday, February 21, 2001, at 7:05 p.m.

REPORTER'S TRANSCRIPT

--o0o--

~~ORIGINAL~~
Draft

REPORTED BY: Christine M. Cradit, CSR #3805

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SOURCE CONTROL OPERABLE UNIT

REVISED PROPOSED PLAN

PUBLIC HEARING

--o0o--

Atwater, California
Wednesday, February 21, 2001, 7:05 p.m.

--o0o--

The following public hearing took place at Atwater City Hall Council Chambers, 750 Bellevue Avenue, Atwater, California, on the 21st day of February, 2001, at 7:05 p.m., heard before Todd Lanning, BRAC Environmental Coordinator, AFBCA/DD-Castle, 4500 North Hospital Road, Atwater, California, 95301, reported by Christine M. Cradit, Certified Shorthand Reporter, in and for the State of California, having offices located at Merced, California.

--o0o--

MR. LANNING: I'd like to welcome you all on behalf of the Air Force and Castle Air Force Base.

This meeting is to talk about the SCOU proposed plan, and I'll be going over that, what is included in the SCOU proposal plan that the comment period is started for, but I'll get into that in more detail in a few.

My name is Todd Lanning. I'm the BRAC Environmental Coordinator for the Air Force in charge of the environmental program out there at Castle, and actually we have in the audience representing the USEPA, we have Ray Smith in the back, and from the Department of the Toxic Substance and -- try that one again, Department of Toxic Substances Regional Control Board, who is also representing them for the State, and we have the California Regional Water Quality Control Board, the actual individual sitting behind you, Duncan Austin.

The rest are pretty much Air Force personnel.

So if you have questions, we have those regulatory agencies here to help answer some of the questions.

As I said a little earlier, the purpose of this meeting is to go over the proposed plan for the Source Control Operable Unit, which includes about 50 sites.

The document's been officially out for review since the 12th of February and will be out for review until the 13th of March, so you can submit comments either in writing or we'll take verbal comments today.

Let's see. Those comments will be responded to in writing and will be included in the Responsiveness Summary in the SCOU 2 ROD.

There is a court reporter here to make sure anything that is recorded is recorded accurately so that we can respond to it also accurately.

As for a little bit of the procedure here, I'll be going through a presentation of what is in the SCOU proposed plan. I don't mind getting interrupted during the proposed plan to answer any questions about the presentation material itself, but if you have specific comments about particular remedial actions being taken at the 50 sites, if you'd save those specific questions for the end, then we can talk about them specifically, and I can get through the entire presentation.

And also, if at the end when you have a specific question, I would like it if you would come to the mike so that everybody can hear the question. If you'd state your name and give your address so that if we have to mail the response of the comment to you, we can do that.

The agenda for tonight -- I pretty much knocked off the first two there with the introductions and background information. I'll be going into the presentation here shortly, and then we will go into the actual comment, public comments. Do we have any questions to get started? Okay. Let me do a little switch here.

Again, the document title that we're talking about today is the Source Control Operable Unit Revised Proposed Plan. Why we're here is, we're talking about a piece of the puzzle for the CERCLA process, and CERCLA, being the Comprehensive Environmental Response Compensation Liability Act. That's the governing laws and rules that drive the clean-up out at Castle.

Castle has pretty much gone through the site assessment phase, and now we're going into the remedial phase.

We start with the remedial investigation and then the feasibility study. This has been accomplished, so now we're going into the proposed plan on these sites. We've investigated them; now we go to the public with what we've found out.

Then we'll do the public review and comment on that proposed plan, and that will give us a proposed decision. An actual decision for each those 50 sites that we're talking about tonight, those will be recorded in a record of decision. That will be the legal document for the decision for those 50 sites.

Then we'll go out and actually clean up the site with remedial design and remedial action, and if the action actually needs some honing in, we'll continue with that all the way out to site closure.

To kind of keep this in context, the SCOU is only a piece of the entire remedial process out at Castle. There is a larger program that this is a part of. The SCOU, the Source Control Operable Unit, basically addresses the soil sites, but we also have a groundwater program, and that's been separated into operable units OU1 and OU2, and we've actually been cleaning up the groundwater with these systems since '94, and we're now in full operation phase of those four treatment plants that are out there. Groundwater systems are basically all in place.

Then you have out at Castle, we have a soil component which we refer to as the Source Control Operable Unit, and we've already taken some removal actions to kind of get a head start on some of the clean-up out there. I'll go into a little more detail on what the SCOU is.

And then we have one other program that we need to integrate the groundwater and the soil back together, and we call that the Comprehensive Base Wide Program. So just to kind of give you a context that this is a piece of a larger puzzle.

As per the Source Control Operable Unit, again, I mentioned that that addresses the soil contamination out at the base, which groundwater level is about 65 feet, so we're addressing the contamination that's above the groundwater. We originally looked at 468 total sites out at the base, and that didn't mean that we pulled samples from all those sites, but we looked at record searches, we interviewed past personnel that worked out at the base and try to identify where the problem areas were.

Two hundred and thirty-five of those sites were tank sites, just underground storage tanks that were out there that we're addressing under another program.

A hundred and eighty-two of the sites, we've already gone through this process of the proposed plan and record decision and in that ROD, which is not quite final yet, addresses all of the actions that are either -- we didn't find any contamination or through removal action we'd already cleaned them up. And it also includes our landfills that are out at the base, so that's a hundred and eighty-two, so that's where we're knocking it out and so that's what the ROD-1 was all about.

SCOW ROD-2 addresses the 50 remaining sites, with the exception of one site, but I'll get to that in a minute.

The Source Control ROD Part 2 has the 50 sites, and those are grouped into 22 of the sites or the volatile organic contaminated sites. They're basically contaminated with compounds like trichloroethylene, the chlorinated solvent type sites.

Sixteen of the sites are very shallow contamination resulting mostly from oil water separators that we can actually go out there and just basically -- we just dig them up and remove them.

And the 12 sites that I have here identified are just stains out on the runway, the parking ramp, actually, from the airplanes. Those stains got there from the engine blasts from the airplanes.

And then to do the full accounting, there's one site left over that is going to be part of the CB, the Comprehensive Base Wide Program, and that will be addressed later, and that one site is the prior training area one. But that's not the subject of tonight.

For evaluation purposes in the investigation in the feasibility study part of the program, all the sites were grouped into eight different categories. It just made it more convenient to evaluate them. These were the eight categories that we have, typical categories that you would find out in an air force base, ranging from engine maintenance shops; wash racks; discharge areas; landfills and disposal pits that were near the landfills; storage tanks tank farms; utility pipes, basically sewer lines and storm drains; hazardous waste storage areas which were basically where they would drum up hazardous waste before it would get shipped off base; surface releases, fire training areas are typical. We had three fire training areas, and the catchall category miscellaneous, which were basically were those stains on the runway fit into that category. They didn't fit into anywhere else, so we had to give them their own funny category.

If you were to look right down the sites into how many you had into each category, here are those eight categories from engine maintenance down to the miscellaneous.

You can see how many were addressed in the SCOU ROD-1, 182 of them we took care of there.

SCOW ROD Part 2 has 50 of them. You can see the distribution. Most of them are these engine maintenance shops with the VOC sites, the volatile organic compound. And then we have the stains and stuff down here.

And then in the CB Part 2, we basically have one site that's going to be fully evaluated there.

Purpose of the proposed plan is many fold, and the four that we've identified up here is to identify what the preferred alternative for the clean-up of all these 50 sites is. The Air Force has gone through this evaluation, and has come up with what they believe is the preferred alternative, so we need to come to the public.

So in the proposed plan, we also describe the alternatives, the different technological alternatives that we can use to clean up these sites that lead us to the preferred one.

We need to go out and then solicit public input on these remedies that we've identified that are appropriate for the site. So we need to solicit public input on the sites and then to provide information to the public on how they can actually get comments back to the Air Force to be considered in the final remedy selection.

Some of those alternatives that were considered in the feasibility study to evaluate, you know, will they clean up the sites or not, the no further action i just kind of there always as a baseline to make sure that you really do need to see something. We always use that as one to consider.

We've looked at intrinsic remediation, which is basically allowing the site itself to remediate on its own through natural processes that go on.

We can use active technologies like soil vapor extraction where we draw vapors out of the soil and then treat them to clean up the site.

Bioventing is a technology that allows us to pump air into the ground and provide oxygen to the natural-occurring bacteria that are there, and they feed on the contaminants that are there.

Land treatment unit is basically -- the way we would be using it at Castle, we take the contaminated soil, bring it to an area where it's actually treated above ground where we again use the natural bacteria that's in the soil to help treat this contamination that's there.

Excavation and disposal off site, I think is self-explanatory.

And then we can also use institutional controls. We can restrict the use of the land to make sure there is no pathway, no way for a person or an animal to come in contact with the contamination there. So we can use legal means or physical means to control the property.

While going through evaluating all these different technologies, it has to meet nine -- nine criteria are used to evaluate it.

The first two are the threshold criteria. These have to be met regardless. Any of those technologies that we decide to use have to pass these two. That's why they have to get past this threshold.

The first one is, it has to be protective of human health and the environment, and the second one has to comply with the laws and regulations, or we refer to it as the applicable or relevant and appropriate requirements. It has to meet those regardless.

The next five criteria are called balancing criteria. We will take a technology and run it against these five criteria and weight them, and then score it at the end.

These five criteria are, is the remedy selected, is it going to be long-term effective so that 20, 50 years ago -- from now, we will have achieved our goal.

Will it reduce the mobility, the toxicity or even the volume of the contaminant there.

Will it be short-term effective. If it takes 20 years before the process even takes effect, that leaves 20 years where somebody can be exposed to the contamination there. So those are also criteria that has to be weighted to find out which technology to use.

And implement number six, can you technically do that technology for that type of contaminant.

And then the seventh one, cost is also very important.

Out of these five, one isn't necessarily weighted any heavier than the other. They're all equal and all important.

And this is where we're at right now. We're down to last two criteria, the modifying criteria. The first seven may have given us a preferred alternative, but now we need to come to the state and community and are these technologies acceptable. So based on input from both, we'll actually then determine the final remedy for a site.

Preferred alternatives that we've come up with based on those first seven criteria, soil vapor extraction, slash, bioventing for those 22 sites that we talked about that are contaminated with the volatile organic compounds.

Soil vapor extraction is basically, again, we draw the air out of the contaminated soil, then pump it through some kind of above-ground vapor treatment of various different technologies, and that is vented to the air.

The other preferred alternative is to physically excavate it, and then ship it off site for disposal at a regulated landfill.

And then the last alternative that was considered is deed restrictions or institutional controls that will affect 12 sites.

Supporting documents that go into the preparation of this one -- this is just basically a summary of the feasibility study that was done. The actual feasibility study and the remedial investigation can be viewed at either the Merced County Library or out at the base at our office.

And that's actually it for the presentation part of the meeting. I'd be more than happy to take questions.

Like I had mentioned earlier, I would appreciate it if you would come to the mike and give me your name and address. That way we can respond to the comments in writing.

MR. GOTCHER: My name is Ron Gotcher. My wife and I manage the Castle Museum and RV park. We're full-time residents out there.

We're concerned with the long-term exposure limits and the contaminants. And I'm also a foreman for Granite Construction Company. We've been directly involved in base clean-up for the past two and a half years, which cause concern for my crew and my own short-term exposure.

The Enviro Fact Sheet states that the Air Force has conducted a remedial investigation and feasibility studies under the Comprehensive Environmental Response Compensation and Liability Act of 1980 or CERCLA, commonly known as Superfund Law. CERCLA sets up the program for the EPA to identify abandoned toxic waste sites, ensure clean-up by responsible parties for the government, evaluate damage to natural resources, and allows the EPA to set up a national priorities list.

In 1986, the Congress passed the Superfund Amendments and Re-authorization Act, SARA, which changes the Superfund law, among other things adding the availability of third party lawsuits, increased civil and criminal penalties, discourages land disposal, stringent clean-up standards with preference for permanent solutions.

While the Enviro Fact Sheet didn't mention SARA, I can only believe they are involved due to the preferred clean-up methods and citizen input as Title Three of SARA is entitled "Community Right To Know and

Emergency Act." Am I right there? Is that what it's called?

MR. LANNING: Yes.

MR. GOTCHER: In light of the circulated Air Force SARA involvement, I have the following questions to address to the Air Force, USEPA, Department of Toxic Substances Control, and California Regional Water Control Board. I can give you all these questions, and you all can review them later. I will give them to you in writing or if you want to answer them as we go.

MR. LANNING: Probably both because I may not be able to answer them all right now.

MR. GOTCHER: Right.

MR. LANNING: Some of the simpler ones, I will go ahead and answer.

MR. GOTCHER: Right. As the chairman here, I will read the questions and wait on your response, or if you want to respond, you all can respond later.

MR. LANNING: Okay.

MR. GOTCHER: Number one, did the 50 sites listed consist of all known contaminated sites at Castle Air Force Base.

MR. LANNING: No. As the presentation there, there were a total of 233 sites that we evaluated, and a hundred and eighty-two of them have already been addressed under the SCOU ROD-1.

These are the 50 remaining, so actually the answer is no. We've already addressed the plan.

MR. GOTCHER: But these are the 50 remaining sites?

MR. LANNING: Yes. Plus the one.

MR. GOTCHER: Right, plus the one. Might some sites or more sites rise in the future requiring clean-up?

MR. LANNING: That's always a possibility, yeah. We feel we've done a pretty thorough job of investigating everything we know, but there's always the potential of something new may turn up.

MR. GOTCHER: Is clean-up criteria based on safe exposure limits to contamination set by the EPA, the EPA Office of Solid Waste, OSHA, Cal OSHA, or the National Institute of Occupational Health and Safety, NIOSH?

MR. LANNING: What was the -- the clean-up level?

MR. GOTCHER: Is clean-up criteria based on not only for the working and for the workers but for the long-term, for the people that live there on the base? When you clean it up, what levels are you going to -- acceptable, permissible levels are you accepting, whose determination?

MR. LANNING: It's actually based on a risk assessment, which actually will -- we calculate what levels are actually acceptable, either for residential use or industrial use based on the reuse of that property that is set in the reuse ROD.

MR. GOTCHER: Right. I understand that. And maybe you might explain it a little bit more.

MR. LANNING: The clean-up levels are based on risk calculations.

Now, the other things that you mentioned, like OSHA, if somebody's out there working for the Air Force to clean up a site, OSHA does apply. And so all the OSHA regulations will apply to that worker who is working.

MR. GOTCHER: I don't know if that --

MR. AUSTIN: Which relates to short-term exposure. And also a lot of the clean-up criteria are based on the idea that the contaminants in the soil might eventually make their way to the groundwater, and in the State of California, we happen to have a policy which prohibits basically continued contamination of groundwater. So a lot of these sites are driven by get that stuff out of the ground before it makes its way down to the groundwater, making the groundwater situation worse than it is already is.

MR. LANNING: That is Duncan Austin.

MR. GOTCHER: Maybe I'm not understanding the answer here, but who is setting the safe permissible levels for long-term exposure out there?

MR. AUSTIN: There's a database that's maintained by the USEPA that contains a lot of information with regards to the rat testing and human data that's available, so there's --

MR. GOTCHER: Basically it's EPA that is setting the standards of what is the permissible levels?

MR. AUSTIN: Right. Well, there's two kinds of levels, and probably Elizabeth can answer this better. But we look at contaminants that cause cancer, and other chemicals which cause just outright health problems. So we divide the contaminants into two classes, and some of them fit into both classes.

But with the cancer causers, the goal is generally a tenth to the minus sixth risk level, which means that, all things being equal, if this person was exposed, they would have a next to one in a million chance of getting cancer due to that level of contamination.

Now, of course, it's a range that we shoot for. Ten to the minus four, which is one in 10,000 to one in a million. So what you do is you look at the chemical and how much cancer it causes in a rat population or something, and you get -- and the more you get, the more cancer you get. So we shoot -- we project down to what level would cause, if you're exposed every day, 70 years of your life, what level would cause an extra one in a million people to get cancer. And that's the level we set. So it's very low in terms of the clean-up.

Now, of course, there's a lot more to it than that because of calculations and, you know, how much water do you drink, and how much soil do you eat, and how much of that kind of vapor gets into your house, and all of that is done with computer models and calculations.

But in the end, it all crunches out to a certain level that can remain that presents this level of risk that's acceptable.

MR. LANNING: Maybe to answer your question, we use EPA numbers to plug into these equations to come up with is this an acceptable risk or not.

MS. ALLEN: What they're based on is -- since you're a resident there, this is particularly relevant to you, is that EPA would assume that someone can live there full time at the site, however they may be exposed to the chemicals, you know, dig in the soil or drink the groundwater, that you can be exposed to those to the levels that we will be willing to leave there for 30 years.

And the reason that EPA uses 30 years is because they've done a lot of studies, which have determined that 90 percent of the people in this country live at one location for 30 years. That's the longest that they live. The average person lives in one place for nine years and then moves on. EPA's policy is that they want to protect somewhere between 90 and 95 percent of anybody that may possibly be exposed.

So the levels that are -- the clean-up levels that are set and are allowed to remain there is that they are levels that someone can be exposed to on a daily basis for 30 years for every day of the year, essentially, and there would be no adverse health effects.

MR. GOTCHER: Right. If they lived there on site, drank the water every day --

MS. ALLEN: Exactly. And if the chemicals are potentially cancer causing, then the risk of cancer to that person generally would not be less than one -- increased by more than one in a million. Those are how we set the levels for making sure that --

MR. GOTCHER: That kind of goes with the next question. Probably maybe answers it. Site 39 lists dioxins known as contaminants. While dioxins are considered to be carcinogen by the International Agency for Research of Cancer, the National Institute -- excuse me, the National Toxicology Program, or regulated by OSHA, according to 29 Code of Federal Regulations 192103, EPA, OSHA, and NIOSH all have different PDL's for carcinogens.

Shouldn't the proper exposure be set at the lowest feasible concentration of all the agencies, and EPA is not the lowest of all the agencies, but EPA is doing its job, right? It's their job?

MS. ALLEN: EPA is one of three agencies.

MR. AUSTIN: Actually the state has lower levels. We use those.

There is a difference between worker exposure and long-term exposure associated with living there, and so you will see a difference in exposure levels in the regulations based on kind of what the exposure scenario is going to be. But in this particular case, with the dioxins, I'm not sure you know what those levels were or what we're remediating to or what we're leaving there.

MS. ALLEN: Generally PDLs --

MR. AUSTIN: We'll look at it again in response to your comment.

MS. ALLEN: A level that is safe for someone to be exposed to over a long term as a resident are much lower, you know, short-term exposure of PDL for occupational.

MR. GOTCHER: Certainly.

MS. ALLEN: So the levels that are set are again based on those safe for residential use. And I should point out that EPA does consider dioxins to be --

MR. STANEK: I'd like to point out this proposed plan, none of these sites deal with dioxins. The sites involved with this public hearing do not involve any dioxin sites.

MR. AUSTIN: Just the fire training areas, and that's one of the ones that's being put off to the end, so --

MR. GOTCHER: You all are leading me right into the next question.

Number five, is the permissible exposure level for clean-up criteria based on immediately dangerous to life or health, short-term exposure limits, or time-weighted averages. And you're saying that --

MS. ALLEN: None of those.

MR. GOTCHER: Long-term, which would be time-weighted averages. If I live there for the next ten years managing the RV park as opposed to me going out there working in it for eight hours a day where I'm wearing protective gear and everything else that we do.

MS. ALLEN: The clean-up levels that we set are lower than you would have for -- as a permissible exposure.

MR. GOTCHER: Well, certainly -- I mean, when we go in there to clean up there in Castle, you know, it's contaminated, we wear protected equipment. When we walked out of there, monitoring was done, soil testing was done, sent to the labs. It was certified clean one hundred percent.

And that's what I wanted to know. When they do this, when they say it's clean, is this clean or time-weighted averages over a long period of time, like this person -- like you said earlier, this person can live here for 30 years and not have a problem. So the question -- we're just leading into each other's thinking on the same line anyways.

Of the 50 sites listed, the preferred clean-up method for 21 sites is soil vapor extraction or in combination with bio. Using these methods, how many years must extraction and monitoring take place to complete clean-up?

MR. LANNING: I think I'll take that one. Based on the sites we've already worked on, these will probably take basically six months to get a system in place and put in the ground, and then operational periods for these would run basically a year to two years.

And then we do post-monitoring. We turn the system off and see if anything releases back into the ground. I mean, we're monitoring vapor concentrations, so stuff that's absorbed to the soil will then go back into the vapor. We make sure that doesn't come back to levels that you need to clean up.

So in that two-year period, we make sure that things don't come back, and then we have to write a closure report. So the whole process takes two and a half years.

MR. GOTCHER: Two and a half years.

There are three sites that are listed with metals and lead, which will be cleaned up by soil vapor extraction.

How long does it take metal and lead to decompose completely into vapor that can be extracted?

MR. LANNING: Well, actually, that's probably misleading, the way it was written. Metals cannot be picked up and cleaned up through soil vapor extraction. We'll have to use excavation to do that.

So those sites that may have listed that, that may have been chemicals that were suspected --

MR. GOTCHER: Associated with it?

MR. LANNING: Well, they were probably just suspected of being in there and that they weren't really requiring clean-up. We didn't find them at levels that needed to be cleaned up. So -- we can't clean metals up with soil vapor extraction. We'll have to go dig them up.

MR. GOTCHER: Sites 32 and 33 list contamination in the metals of PAHs from the utility pipes and storm drains with clean-up by SVE.

These pipes and drains are still intact or partially intact, wouldn't removal and disposal be the preferred method?

MR. LANNING: Again, I think it's the same thing. We test it for those compounds. They were probably there present but at low enough levels that they didn't require clean-up, but if the VOCs were there, then we would use the SVE.

But you're absolutely right, we can't use SVE clean-up.

MR. GOTCHER: There are 33 sites listed with fuels and solvents, yet none of these sites are scheduled to be cleaned up by biopile land treatment, more commonly known as land farming. Won't this method of variation of biodegradation eliminate benzenes and hydrocarbons associated and be more cost effective?

MR. LANNING: It definitely is a very cost effective way to treat things if it's shallow. If it's deep, more than 20 feet, then you have to go to more costly method, either the bioventing into the ground or soil vapor extraction.

If it's less than 20 feet, excavation is looked at, and in the feasibility study, we do the cost analysis to find out which is more effective.

MR. GOTCHER: You mentioned that a lot of them are shallow. Of course, the stains are not the level -- we're not talking about that. But like on this shallow material that is containing fuels and solvents, can't that be picked up and taken to the land farm and processed there using the natural process there?

MR. LANNING: Usually, such techniques are generally cheaper than having to dig something up and move it generally. It depends on volumes of land and mass. I'm not sure which sites you're specifically referring to, but most of the 22 sites that we're cleaning up with bioventing and soil vapor extraction are deep. Contamination goes all the way up to 50 to 55 feet deep, and there's just no way we're going to dig down that deep. So that's basically those 22 sites have deep contamination.

MR. GOTCHER: Out there at the base, you hit hardpan anywhere from three to five feet.

MR. LANNING: Right.

MR. GOTCHER: And this went all the way through hardpan?

MR. LANNING: The hardpan is not continuous all the way across the base. It actually is more prevalent over on the north side, and it's thicker, and then towards the southern side of the base, then it becomes very hit and miss where you'll actually find it.

And actually the hardpan has prevented a lot of the contamination from going deep into the groundwater but not all of it because --

MR. GOTCHER: Well, there are a lot of places, too, where the Air Force, where they used to make landfills where they actually dug through the hardpan with the trenches, buried this stuff. Once it went through the hardpan, then they opened it up, and then it contaminated further. But we noticed off in other places that the hardpan would be stained like the top foot, and then you get -- a few inches, and then you get down there, and it's gone. Never been able to penetrate it if it wasn't disturbed.

MR. LANNING: It's a very, very useful thing.

Actually, I believe it to have retarded a lot of the penetration and saved a lot of the groundwater, protected it. So, yeah, you're absolutely right about the hardpan, but it's not perfect.

MR. GOTCHER: Oh, no. Anyplace it's been breached and broken. But you said you didn't know which sites it was talking about. But there were 33 on this sheet that you all submitted in the Enviro Sheet. Lists 33 sites with fuels and solvents.

MR. LANNING: Yeah. And most of those -- okay. Those would be shallow. These solid waste management units would be shallow.

When you're talking about the buildings like these -- these are like -- the solid waste management units are like -- these would be oil, water separator type things.

MR. GOTCHER: Okay.

MR. LANNING: So it is appropriate to excavate because it would be shallow. But where we had buildings and things like this, most of the contamination is pretty deep, so that's when the SVE becomes appropriate.

MR. GOTCHER: There's an excavation and off-site disposal, a zone capping with institutional controls provide a quick, complete, and permanent clean-up for most sites?

MR. LANNING: Yes.

MR. GOTCHER: Can any or all the base property be deeded to Merced County prior to final clean-up?

MR. LANNING: Yeah. What has to happen, if you have a long-term remediation that's in place -- most of the soil clean-ups are short-term, as you know. The landfills, they're gone.

If you have a long-term system, more like our groundwater problem that's going to be there from 20 to 30 years, what we have to do -- once we get the system in place, we don't have to wait until 20, 30 years until we clean up the whole site.

All we have to do is demonstrate that the system in place will attain its objective, its final remedial goal.

If it looks like it's going to do that, if we get it in place, collect the data, six months to a year it shows that it's going to attain that goal, at that point in time, we can write a document that basically is called operating properly and successfully.

And with agency concurrence, if they agree with the Air Force that it is doing what it was designed to do and it looks like it will meet its remedial goal, at that point in time, we can then deed the property over to the LRA, the Local Reuse Authority, which Castle is the County now. So we don't have to wait 20 or 30 years, but we do have to wait to approve that.

MR. GOTCHER: But that means also you could deed the property, but you will still maintain the clean-up until you have acceptable levels?

MR. LANNING: Twenty or 30 years for the groundwater.

MR. GOTCHER: Or if it takes longer.

MR. LANNING: Oh, yeah, we will be here till it's done. Yeah, there's no doubt about that.

MR. GOTCHER: Might have answered some of this. Since JPA no longer exists, will the City of Atwater have any control over the clean-up?

MR. LANNING: Not directly. Not like the Local Reuse Authority, which actually they have -- City of Atwater, we have actually a city councilman on our Restoration Advisory Board. He serves on the board as a concerned citizen, not as a member of the City Council, but that is a forum in which all citizens, including everybody in the City of Atwater, can get their input through the Restoration Advisory Board or through these kind of public meetings.

So I don't know if that --

MR. GOTCHER: Well, of the 50 known sites listed here, what is the estimated time frame to start and complete the clean-up?

MR. LANNING: The SVE sites are going to be the longest ones, which we've just talked about, so two to three years to finish all of those after the system's been put in place. And right now at the end of the year 2002, we intend to have all of them in place, so somewhere around 2005, 2006 they'll be done, is the schedule.

MR. GOTCHER: At the museum out there, they're only running the wells checking on them. There's not an actual extraction process, but they're monitoring on the wells. In the museum area, there are there no known contaminants?

MR. LANNING: Our groundwater plume stretches underneath the museum. As far as any surface sites --

MR. GOTCHER: Nothing in that, right. That's what I mean, surface sites. I'm sorry.

MR. LANNING: There are none.

MR. GOTCHER: Okay.

MR. LANNING: Actually, for your information, this is the map of the 50 sites, and the museum is -- basically has this property right here. Your trailer area is right in here. So as you can see, we've investigated a few sites in this area that have all these black labels, but they are not sites which remediation.

MR. GOTCHER: Only the ones that are --

MR. LANNING: Those are the stains that will require institutional controls. The dark gray ones are the ones that will actually be -- those are most of the SVE sites. And they're hard to find, but there are several. There's like 12, 13 little yellow ones that are the excavations. And as you can see over in your area, we have none. Lot. That's been pretty much open area through the entire use of the base.

MR. GOTCHER: Well, thank you for your time, and I'll let somebody else talk.

MR. LANNING: If you want to leave a copy of those, we'll make sure we get a written response to all of them.

MR. GOTCHER: He'll make a copy.

MR. LANNING: That's fine. Just give us a return address. Thank you.

Are there any other comments? With that, I'd really appreciate you coming out and letting us know what's on your minds about the sites, and that's about all I have to say.

We'll respond to the comments in writing and get those back to you. And with that, I'll adjourn it. Thank you very much.

(The hearing concluded at 7:45 p.m.)

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STATE OF CALIFORNIA,)
: ss.
COUNTY OF MERCED)

I, Christine M. Cradit, do hereby certify:

That I am a licensed, Certified Shorthand Reporter, duly qualified and certified as such by the State of California;

That the foregoing was by me recorded stenographically at the time and place first therein mentioned; and the foregoing pages constitute a full, true, complete and correct record.

That I am a disinterested person, not being in any way interested in the outcome of said action, nor connected with, nor related to any of the parties in said action, or to their respective counsel, in any manner whatsoever.

Dated this 12th day of March, 2001.

C.M. Cradit, CSR No. 3805